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February 28, 1983

Mr. Russell H. Wyer
Director, Hazardous Site Control Division
Office of Emergency and Remedial
Response (WH-548-E)
Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460

Re: Comments of Johns-Manville Sales Corporation Concerning Proposed National Priorities List, 47 Fed. Reg. 58476 (Dec. 30, 1982)

Dear Mr. Wyer:

On December 30, 1982, the United States Environmental Protection Agency ("USEPA") proposed amending the National Oil and Hazardous Substances Contingency Plan ("NCP") by adding the National Priorities List as an Appendix B to the NCP, 47 Fed. Reg. 58476 (Dec. 30, 1982), and solicited comments concerning this proposal. Johns-Manville Sales Corporation has reviewed the proposed National Priorities List and submits the following comments concerning it.

Johns-Manville Sales Corporation owns and operates a facility in Waukegan, Illinois which manufactures building materials, some of which contain asbestos. As part of the operation of this facility, Johns-Manville Sales Corporation maintains an area, located on-site, which is used for the disposal of certain of the waste materials generated at the Waukegan

facility, including asbestos. This on-site disposal area was evaluated by USEPA pursuant to the Hazard Ranking System ("HRS"), which is Appendix A of the NCP, and has been listed on the proposed National Priorities List.

This listing was improper. When USEPA applied the HRS to the on-site disposal area at the Waukegan facility, it did not consider data commonly available which is encompassed by factors in the HRS nor did it assign appropriate scores to the data which it did consider. As a consequence, the HRS score derived by USEPA for the Waukegan facility is incorrect. If all the data called for by the HRS had been evaluated correctly by USEPA and if the HRS had been applied as specified in Appendix A to the NCP, the Waukegan facility would have received a score lower than 28.50. Accordingly, the on-site disposal area at the Waukegan facility should be eliminated from the proposed National Priorities List.

Furthermore, even if the HRS evaluation of this site had been done correctly and had resulted in a score higher than 28.50, the on-site disposal area at the Waukegan facility should be eliminated from the proposed National Priorities List as no remedial actions need to be undertaken at the site. The site is operated in compliance with the national emission standard for asbestos which has been established in the National Emission Standards For Hazardous Air Pollutants ("NESHAP"), 40 C.F.R.

Part 61, Subpart B (1982), under Section 112 of the Clean Air Act, 42 U.S.C. §7412. The NESHAP for asbestos is a comprehensive regulation governing, among other things, the collection, processing, packaging, transporting, and disposition of asbestos-containing waste materials. No further regulation under the NCP is needed for a site which already is regulated in this comprehensive manner under the Clean Air Act.

A.
NATURE AND OPERATION OF THE ON-SITE DISPOSAL AREA AT THE WAUKEGAN FACILITY

The Waukegan facility maintains and operates an area of its site for the disposal of certain waste materials which it generates. This on-site disposal area has been operated by Johns-Manville Corporation since 1922. Throughout the time the disposal area has been in use, some of the waste placed in it has contained asbestos. The disposal area is operated and maintained as required by the NESHAP for asbestos, 40 C.F.R. §61.25 (1982).

As part of the current operation and maintenance of the disposal area, waste, some of which contains asbestos, is added to the material already present at the area. This asbestos is in several forms, including fibers which have been placed in sealed plastic bags labeled "caution-asbestos," asbestos which has been encapsulated in a cementitious or rubber matrix, and

asbestos which is contained in sludges dredged from the settling ponds. Asbestos which is placed in the disposal area is managed as required by the NESHAP for asbestos: that is either there are "no visible emissions to the outside air," 40 C.F.R. §61.25(a) (1982), or the asbestos waste is covered, within twenty-four hours, with at least six inches of compacted, non-asbestos-containing material, 40 C.F.R. §61.25(e)(1)(1982).*

B.
THE HRS IMPROPERLY WAS APPLIED TO THE ON-SITE DISPOSAL AREA AT THE WAUKEGAN FACILITY

The HRS was designed to consider "the minimum quantity of data commonly available that will yield a meaningful estimate of the level of hazard posed by each site." 47 Fed. Reg. 58479 (Dec. 30, 1982). When, however, the HRS was applied to the on-site disposal area at the Waukegan facility, USEPA did not consider certain data called for by the HRS which was readily available to USEPA. As a consequence, the HRS score derived for the Waukegan facility is incorrect.

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* "The Agency [USEPA] recognizes that the best available disposal methods for some of the sources may not be capable of preventing visible emissions during a minor portion of some of the disposal operations. Therefore, alternative methods of compliance that represent the best available disposal methods have been included in the regulations....For those alternative methods that may not be capable of preventing visible emissions during all portions of the waste disposal process, a requirement has nevertheless been included that there be no visible emissions from those portions of the process that can achieve this performance level." 40 Fed. Reg. 48296 (Oct. 14, 1975).

Compounding this error, as well as creating further discrepancies in the HRS score given to the Waukegan facility, USEPA also failed to follow in certain instances the instructions given for applying the HRS to a given site. "Detailed instructions" were provided in the NCP for using the HRS, in part to insure uniform application of the ranking system so that a "uniform technical judgment regarding the potential hazards presented by a facility relative to other facilities" would result. 47 Fed. Reg. 31220 (July 16, 1982). As a result, not only is the HRS score given to the Waukegan facility wrong but also the score has no validity with respect to the priority which should be assigned to any releases from this facility given that the Waukegan facility was not evaluated using the uniform approach contemplated by the HRS.

Furthermore, USEPA did not provide in the Documentation Records For Hazard Ranking System ("documentation records"), which sets forth the data and documentation used to apply the HRS to the Waukegan facility, any basis for or explanation of certain values which were assigned in the HRS scoring process. As a consequence, Johns-Manville Sales Corporation effectively has been deprived, at least as to these valuations, of an opportunity to comment on the proposed inclusion of the Waukegan facility on the National Priorities List.

The errors in data considered, in instructions followed, and in documentation records provided are described in detail below in relation to the final HRS score sheet and documentation records prepared for the on-site disposal area at the Waukegan facility, a copy of which is attached hereto and marked as "Attachment A." Because of these errors, this site should be eliminated from the proposed National Priorities List.

1.
Significant Errors were
Committed in Preparing the
Ground Water Route Work Sheet

A value of 3 has been assigned to the rating factor of "containment" (figure 2 of Attachment A), and the documentation records include the note that

> since the built up area is likely to contain friable asbestos waste as well as consolidated asbestos waste material (from early waste disposal techniques), and the piles are not covered with an appropriate cover material (i.e. earthen material) and no liner reportedly exists (IEPA division file memo from Mary Schroeder dated 2/8/80) this would rate a 3.

(page 4 of the documentation records portion of Attachment A). This evaluation of the "containment" present at the Waukegan site is incorrect.

The directions to the HRS state that the rating factor "containment" is to be a "measure of the natural or artificial

means that have been used to minimize or prevent a contaminent from entering ground water", thus indicating that the key consideration in assigning a value to the factor is to be whether or not the contaminent evaluated can penetrate into ground water. 47 Fed. Reg. 31229 (July 16, 1982). This indication is reinforced in the portion of the directions which relate to the "waste characteristics" rating factor, where the statement is made that "[i]n determining a waste characteristics score, evaluate the most hazardous substances at the facility that could migrate (i.e., if scored, containment is not equal to zero) to ground water." Id. (emphasis added).

Thus, if the hazardous substance being evaluated with respect to the factor "containment" will not migrate into ground water, this factor should be given a value of zero. This should be so whether there will be no migration due to the presence of such artificial mechanisms as liners and leachate collection systems or due to the natural properties of the hazardous substance, itself, such that may prevent migration. Table 3 of the directions to the HRS, which sets forth the "Containment Value For Ground Water Route" acknowledges as much by stating the "value '0' does not indicate no risk. Rather, it indicates a significantly lower relative risk when compared with more serious sites on a national level." Id.

The documentation records indicate that the contaminent evaluated with respect to the rating factor "containment" was asbestos. (page 4 of the documentation records portion of Attachment A). As such, the value assigned to the factor should have been 0. Migration of asbestos through soil is, at most, minimal. USEPA in a 1977 report titled "Movement of Selected Metals, Asbestos, and Cyanide In Soil: Applications to Waste Disposal Problems" concluded that

> [s]ince the weathering products of asbestos are the common nonhazardous salts of Ca, Mg, and Si, physical transport is the only mode of movement in soil which is of significance. The extensive data on movement of clay-sized (<2 u diameter) particles by strictly physical processes provide a convenient yardstick for gaging the probable behavior of asbestos in soil. Clay particles 0.1 to 2.0 u in diameter are estimated to move at a rate of 1 to 10 cm per 3,000 to 40,000 years, depending on the soil texture (Berkland, 1974). There is no reason to expect that asbestos particles of similar sizes would move differently from this. Consequently, asbestos migration through soil will not be a problem of any significance.

Id. at 121. See preamble to NESHAP for asbestos, 38 Fed. Reg. 8822 (April 6, 1973) ("The contamination of ground water supplies with asbestos from landfill disposal is not considered a potential problem.").

The documentation records with respect to the rating factor of "containment" are in further error in that one reason given for assigning the factor the value of 3 was that "the

piles are not covered with an appropriate cover material (i.e. earthen material)." (page 4 of the documentation records portion of Attachment A). As has been noted in section A of these comments, supra, the on-site disposal area at the Waukegan facility is operated in accordance with the NESHAP for asbestos: either there are "no visible emissions to the outside air," 40 C.F.R. §61.25(a)(1982), or the asbestos waste is covered, within twenty-four hours, with at least six inches of compacted, non-asbestos-containing material, 40 C.F.R. §61.25(e) (1982).

Thus, the statement that "the piles are not covered with an appropriate cover material (i.e. earthen material)" is incorrect: not only factually, for cover is being applied when required, but also legally, because the comprehensive regulations promulgated as the NESHAP for asbestos have made the controlling determination concerning the appropriateness of the cover which is to be applied. This latter point concerning the compelling effect of the NESHAP for asbestos is discussed more fully in section C of these comments, infra.

The rating factor "waste characteristics" has been assigned certain values with respect to "toxicity/persistence" and to "hazardous waste quantity" and certain written evaluations of this rating factor have been included in the documentation records. These values and evaluations were made in error. As has been discussed with respect to the rating factor

"containment," asbestos exhibits minimal migration through soil and so should be assigned a "containment" value of 0. For the same reason, the evaluation given in Attachment A to the factor "waste characteristics" was incorrect.

The directions to the HRS instruct an evaluator "[i]n determining a waste characteristic score, [to] evaluate the most hazardous substances at the facility that could migrate (i.e., if scored, containment is not equal to zero) to ground water." 47 Fed. Reg. 31229 (July 16, 1982). In applying the HRS to the on-site disposal area at the Waukegan facility, the documentation records in Attachment A indicate that asbestos was the substance used to determine the score for the "waste characteristics" factor. This was incorrect as asbestos will not migrate to ground water.

The numerical value and written documentation assigned to the rating factor "waste chacteristics" is further incorrect in the evaluation given to "hazardous waste quantity." Again, to assign any value to "hazardous waste quantity" on the basis of the amount of asbestos contained in the on-site disposal area at the Waukegan facility is in error given the plain direction of the instructions to the HRS that "Hazardous waste quantity includes all hazardous substances at a facility (as received) except that with a containment value of 0." 47 Fed. Reg. 31229 (July 16, 1982) (emphasis original).

2.
Significant Errors were
Committed in Preparing
the Surface Water Route
Work Sheet

The rating factor "containment" has been assigned a value of 2 (figure 7 of Attachment A), and the documentation records note that

> since the built up area is likely to contain friable asbestos waste as well as consolidated asbestos waste material (from early waste disposal techniques) and the piles are not covered with an appropriate cover material (i.e. - earthen material) and the containment/diversion system is potentially unsound (inadequate cover of build up area) - this would rate a 2.

(page 7 of the documentation records portion of Attachment A). This characterization of the containment at the Waukegan site is wrong, and the value which has been derived for this rating factor is incorrect.

As stated in the instructions to the HRS, the rating factor "containment" is to be "a measure of the means that have been taken to minimize the likelihood of a contaminent entering surface water either at the facility or beyond the facility boundary." 47 Fed. Reg. 31236 (July 16, 1982). Accordingly, these instructions direct a value of zero be given if "all the waste at the site is surrounded by diversion structures that are in sound condition and adequate to contain all runoff, spills,

or leaks from the waste;" in particular, a waste pile* is to be assigned a "containment value" of 0 if "[p]iles are covered and surrounded by sound diversion or containment system." Id. at Table 9.

The contaminant evaluated for purposes of assigning a value to the rating factor "containment" was asbestos. (page 7 of the documentation records portion of Attachment A). However, the means which have been taken at the Waukegan facility to minimize the likelihood of asbestos entering surface water apparently were ignored in assigning a value to this factor. As has been discussed in section A of these comments supra, waste asbestos which is deposited in the on-site disposal area at the Waukegan facility is managed as required by the NESHAP for asbestos: either there are "no visible emissions to the outside air," 40 C.F.R. §61.25(a) (1982), or the asbestos waste is covered, within twenty-four hours, with at least six inches of compacted, non-asbestos-containing material, 40 C.F.R. §61.25(e)(1) (1982). This is the mechanism of containment which has been deemed to be adequate by the NESHAP for asbestos,

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* By referring as way of example to the category "waste pile" in Table 9 of the instructions to the HRS, 47 Fed. Reg. 31236 (July 16, 1982), Johns-Manville Sales Corporation is not agreeing with the evaluation made in the HRS score sheet prepared for the Waukegan facility that the on-site disposal area is a waste pile rather than a landfill. This reference merely is given to show that, even using USEPA's characterization of the on-site disposal area, the value assigned to the rating factor "containment" is incorrect.

40 C.F.R. §61.25 (1982), a regulation promulgated specifically to address the peculiar properties of asbestos, and appropriate factual as well as legal deference* should be given to its requirements in any HRS evaluation. Thus, it simply is incorrect for the conclusion to be reached, as it was in Attachment A, that "the piles are not covered with an appropriate cover material". (page 7 of the documentation records portion of Attachment A).

Furthermore, as has been discussed in section B(1) of these comments, supra, once asbestos waste is covered properly there is minimal movement of the material through soil. See USEPA, "Movement Of Selected Metals, Asbestos, And Cyanide In Soil: Applications To Waste Disposal Problems" at 121 (1977) ("1977 USEPA report on the movement of asbestos"). Accordingly, there should be minimal effect on surface water. For example, the data on soil migration contained in the 1977 USEPA report on the movement of asbestos suggests that it would take a minimum of 2,743,000 years for asbestos from the on-site disposal area at the Waukegan facility to reach Lake Michigan, which has been identified in Attachment A as the "target" of the surface water route, (page 8 of the documentation records portion of

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* The appropriateness of a certain legal deference to the NESHAP for asbestos is discussed in section C of these comments, infra.

Attachment A). Accordingly, the value assigned to the rating factor "containment" is erroneous.

The rating factor "waste characteristics" has been assigned certain values with respect to "toxicity/persistence" and to "hazardous waste quantity" and certain written evaluation of this rating have been included in the documentation records. Such evaluations should not have been made. The instructions to the HRS state that waste characteristics for the surface route are to be evaluated "with the procedures described in Section 3.4 for the ground water route." 47 Fed. Reg. 31236 (July 16, 1982). The procedures in Section 3.4, in turn, direct that the substance to be evaluated in calculating the waste characteristics score is the hazardous substance "that could migrate (i.e., if scored, containment is not equal to zero) to ground water." 47 Fed. Reg. 31229 (July 16, 1982).

The hazardous substance evaluated with respect to the rating factor "waste characteristics" was asbestos. (page 8 of the documentation records portion of Attachment A). As has been discussed, asbestos waste deposited in the on-site disposal area at Waukegan should experience, at most, minimal migration. Accordingly, the evaluation of the rating factor "waste characteristics" is incorrect.

3.
Significant Errors were
Committed in Preparing
the Air Route Work Sheet

The rating factor "observed release" has been assigned a value of 45 (figure 9 of Attachment A), apparently on the basis of "upwind, midsite, and downwind samples" taken on April 28, 1982. (page 11 of the documentation records portion of Attachment A). The documentation records to Attachment A, however, do not set forth what these samples showed nor how these samples compared to background levels.

The instructions to the HRS are explicit in stating that the "only acceptable evidence of release for the air route is data that show levels of a contaminant at or in the vicinity of the facility that significantly exceed background levels, regardless of the frequency of occurrence," 47 Fed. Reg. 31236 (July 16, 1982) (emphasis added). Thus, USEPA is required to make at least two determinations before it may conclude that that there is an "observed release" for the air route: first, a judgement must be made about what the background level of the contaminant is and, then, a decision must be reached that data indicates this background level has been exceeded significantly. The documentation records, however, do not indicate that any determination was made concerning the background level of asbestos, the contaminant "detected." Neither do the documenta-

tion records show that any determination was made with respect to why the asbestos emissions observed were considered to constitute a significant exceedence.* See page 11 of the documentation records portion of Attachment A. Accordingly, the evaluation of "observed release" is defective under USEPA's own instructions for applying the HRS.

Even ignoring this deficiency in the scoring of the "observed release," this rating factor still may not be assigned a value of 45 because data which readily was available to USEPA will not support finding that levels of asbestos at or in the vicinity of the Waukegan facility "significantly exceed background levels."

On or about September 17, 1982, USEPA provided Johns-Manville Sales Corporation with the results of air sampling which had been conducted by the Ecology and Environment Company, under contract to USEPA, at the on-site disposal area of the Waukegan facility on April 28, 1982 ("USEPA Test Results"). A copy of these results are attached hereto and marked as

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* If either such determination in fact was made, Johns-Manville Sales Corporation requests that it be provided with the results of the determination as well as an explanation of how it was reached. Without this information, if in existence, Johns-Manville Sales Corporation effectively has been deprived of an opportunity to comment on this aspect of the proposed inclusion of the Waukegan facility on the National Priorities List.

"Attachment B." The reference to "samples" in the documentation records apparently is to this. The air sampling conducted yielded the following:

USEPA TEST RESULTS

Location and type of sample	Fibers/cubic centimeter*
Upwind:	
- coarse fibers**	0.70
- fine fibers***	0.02
Midsite:	
- coarse fibers	12.00
- fine fibers	0.20
Downwind:	
- coarse fibers	21.0
- fine fibers	below detection limit

There are several questions concerning the significance of the USEPA Test Results when these results are considered by themselves, independently of the questions which exist and which are discussed below concerning the significance of these test results when compared to background levels.

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* Measured at 20,000X magnification using an electron microscope.

** Fibers ranging from 2.5u to 15u in size.

*** Fibers smaller than 2.5u in size.

First, there is some doubt about the means used to obtain the samples analyzed for the USEPA Test Results. Three Sierra Virtual Impactors were used for the testing. These are particulate samplers which are supposed to have the capability of discriminating between inhalable and non-inhalable particles and of classifying particles into two size ranges. Accordingly, particles larger than 15u were to be excluded from the samples collected and particles smaller than 15u were to be separated into two size fractions, one of the particles in the size 2.5u to 15u and the other of particles smaller than 2.5u.

It appears, however, that this intended separation did not occur. For example, the USEPA Test Results indicate that the largest single chrysotile fiber diameter counted in the downwind coarse sample was 0.7u* and the next largest had a diameter of 0.3u. The sampler which collected this was to have diverted fibers under 2.5u to the fine fraction filter. Obviously, the separation did not occur, suggesting that the sampling equipment malfunctioned or that the coarse and fine filters inadvertently were interchanged or mismarked.

If the filters were interchanged, then the fibers counted in the downwind coarse filter actually were fibers col-

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* The diameter actually recorded in Attachment A was 14 millimeters. However, this measurement of 14 millimeters occurred at 20,000 x magnification. Accordingly, the actual diameter of this fiber was 0.7u.

lected from the air sample drawn through the downwind fine filter. This makes a crucial difference to the calculation of the concentration of asbestos fibers present in each sample. The number of asbestos fibers counted in the sample must be related proportionately to the volume of air drawn through each sample taken if a figure for concentration of fibers is to be derived. A different volume of air was passed through the coarse filter than through the fine filter. The downwind sampler channeled 6,800,000 cubic centimeters of air through the fine filter while it channeled 752,000 cubic centimeters of air through the coarse filter.

A total number of 250 chryostile fibers were counted in the supposed coarse filter. The USEPA Test Results related these 250 fibers to 11.75 cubic centimeters of air, as this was the amount drawn through the actual coarse filter.* As a result, a concentration of 21 fibers per cubic centimeter (i.e. 250 fibers/11.75 cubic centimeters of air) was derived. If, however, the supposed coarse filter actually was the fine filter,

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* The laboratory which analyzed the samples taken examined 2 grid sections (each 0.0075 square millimeters in size) of the downwind (coarse) filter. Thus, 0.00156% of the total area (960 square millimeters) of this coarse filter was examined. The grid sections examined were proportional to the air which passed through each filter. As 752,000 cubic centimeters of air in total was channeled through the entire coarse filter, then by examining 2 grids (or 0.00156%) of the entire coarse filter the chrysotile fibers present in 11.75 cubic centimeters of air (i.e. 0.00156% of 752,000) actually were counted.

then the number of chryostile fibers counted should have been related to a different volume of air, for approximately nine times the volume of air passed through the actual fine filter as went through the actual coarse filter. Accordingly, the 250 fibers of asbestos counted in the supposed coarse filter should have been related, on this assumption that the coarse and fine filters somehow were switched, to 106.25 cubic centimeters of air,* and a concentration of 2.35 fibers per cubic centimeter (i.e. 250 fibers/106.25 cubic centimeters of air) would have been estimated for the portion of the air passing through the filter labeled as the coarse filter. This result, which is 11% of that derived in the USEPA Test Results, is significantly different from that apparently used by USEPA in applying the HRS to the Waukegan facility.

Second, it is more valid scientifically to have calculated the concentration value on the basis of a balanced composite sample. Furthermore, such a composite would eliminate the question of whether or not the coarse and fine filters were

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* As noted, the grid sections examined were proportional to the air which passed through each filter and 2 grids (constituting 0.00156% total area) of the coarse filter were counted. Assuming 6,800,000 cubic centimeters of air (the amount which went to the fine filter) actually were filtered through the filter labeled as coarse, then the chrysotile fibers present in 106.25 cubic centimeters (i.e., 0.00156% of 6,800,000) really were counted.

interchanged. To derive a composite using the USEPA Test Results, the 250 chrysotile fibers counted in the supposed coarse filter sample and related to 11.75 cubic centimeters of air may be combined with the no detectible fibers associated with 106.25 cubic centimeters of air in the supposed fine fraction; when this is done, a composite value of 2.1 fibers per cubic centimeter (250 fibers/118 cubic centimeters of air) is derived. This value is one-tenth the size of the concentration derived for the downwind coarse filter in the USEPA Test Results.

Third, there is some doubt about the representiveness of the upwind coarse sample. Observers at the Waukegan facility on April 28, 1982 noted that this sample was damaged when removed from the sampler head, and a representative of the Ecology and Environment Company indicated that the upwind coarse sample would not be submitted for electron microscope analysis. Nevertheless, it was analyzed and included in the USEPA Test Results without any explanation of what effect this damage had on the sample results.

Fourth, there is some question concerning the precision and accuracy of results obtained through use of an electron microscope, which was the method used to analyze the samples taken. These problems of precision and accuracy are illustrated by comparing that method to the optical microscope method, or

membrane filter method, which has been extensively used and analyzed, particularly for occupational monitoring at asbestos-using locations.

The membrane filter method was developed in Great Britain in the 1960s, and since that time it has been adopted by almost every industrialized country as the approved method for monitoring the workplace. In the United States, the Occupational Safety and Health Administration ("OSHA") has prescribed a workplace standard for asbestos emissions which is stated in terms of a numerical concentration that is to be measured in that manner "made by the membrane filter method at 400-450X (magnification) (4 millimeter objective) with phase contrast illumination." 29 C.F.R. §1910.1001(e)(1982).

The membrane filter method as used officially in the United States has been developed by the National Institute for Occupational Safety and Health ("NIOSH"). The latest version of the method, which was issued in 1977, is referred to as Method No. P&CAM 239. The method has been studied in great detail in a number of laboratories so that there is a great deal of documentation available regarding both the precision and accuracy.

After a sample has been collected in the workplace and properly prepared for microscopic examination, the fibers are counted using phase contrast elimination at a magnification of approximately 450X. Depending on the quality of the micro-

scope and the visual acuity of the observer, the minimum diameter of fiber which can be observed by this method will be about 0.5 micrometers. Any fibers with smaller diameters, regardless of their length, will not be detected by this method. All agree that, even though all fibers present in the working environment are not detected, the method does provide a consistent index of worker exposure.

There are also very well-defined limits for the sensitivity of the membrane filter method. It is generally agreed that for the assessment of most workplace fiber concentrations, the method is reliable only for concentrations 0.5 fibers per cubic centimeter or greater. The detection limit for the method is generally considered to be 0.1 fiber per cubic centimeter: in other words, at that level it is possible to say that concentration is such that the fibers cannot be reliably quantified. In many cases, numbers smaller than 0.1 fiber per cubic centimeter are reported without qualification, but it must be remembered that they do not have any meaning whatsoever.

Because of the universality of the membrane filter method, it has been used, and most likely will continue to be used, as the primary method for assessing worker exposure for epidemiological and other health-related studies. There are occasional pressures to change to a method which is more sensi-

tive. However, due to the difficulties in correlating the results of one method with another, such a move would serve only to add considerable confusion to our existing epidemiological data base.

Due to the limitations of the membrane filter method and the low concentrations of asbestos fiber which exist in the general environment outside of the workplace, considerable effort has been devoted over the past decades to fiber analysis using the electron microscope. The transmission electron microscope has the advantage of having much superior resolution so that it can detect asbestos fibers with diameters as small as 0.03 micrometers (0.03 micrometers is the approximate diameter of the smallest chrysotile fibril known to exist). If the microscope is equipped with the proper ancillary equipment, it is also possible to conduct chemical analyses as well as to study the crystal structure of these minute particles. With such capability, it is possible to completely characterize the mineralogical nature of each of the fibers which is counted.

Even though the transmission electron microscope sounds like the ideal instrument for fiber analysis, it too suffers from several serious limitations. First of all, a fully equipped analytical transmission electron microscope will cost in excess of $500,000.00. This cost has limited the number of laboratories and of trained technicians able to operate the

instrument. The techniques used to prepare the sample for examination in the transmission electron microscope are also quite complex, and there are also very serious questions as to the loss of fibers and possible alteration of the sample during the procedure. In addition, the counting by this technique is rather slow and tedious, with the result that a technician can only handle about two samples per day without an excessive amount of fatigue.

Although the transmission electron microscope methodology has been under investigation for several years, there is very little reliable information available concerning the precision and accuracy. Some laboratories will report that they can reproduce results within a factor of two or three. If this is true, it only applies to ideal circumstances within a particular laboratory. Inter-laboratory studies where duplicate samples have been carried through the entire preparation and counting technique, have, in many cases, produced results which vary by as much as a factor of ten or more. The National Bureau of Standards, under contract from USEPA is currently in the process of preparing standard filters which can be used in an effort to obtain reliable inter-laboratory comparisons. They will also be very valuable for intra-laboratory precision studies. These samples should be available from the National Bureau of Standards sometime in 1983. It is only through ef-

forts such as these that we will begin to understand the wide variability in inter- and intra-laboratory results and so be able to attempt to solve the problem of variability.

The greatest problem which exists with electron microscope counting data is the lack of understanding of the true meaning of these counts. In all too many cases it is assumed that electron microscope counts are equivalent to counts obtained by the membrane filter method. This is not true -- the data cannot be used interchangeably. The mere fact that the electron microscope has the capability of detecting all of the fibers present, makes it impossible to assume that the results are comparable.

Data which are available in the literature vary from as much as a 2 to 1 ratio for the transmission electron microscope over optical to as high as a 1,000 to 1 ratio. See, e.g., Steel, Small, Sheridan, "Analytical Errors In Asbestos Analysis By Analytical Electron Microscopy" (National Bureau of Standards Special Publication 619, issued March 1982). Each of these numbers, plus a host of numbers in between, could very well be justified under a particular set of circumstances as a true correlation factor. However, when a sample is obtained from the general environment where the source cannot be characterized, it is absolutely impossible to obtain a correlation between the transmission electron microscope and membrane filter

results. The principle reasons for this are the fact that the optical counts are normally well below the applicable limits for the method and the completely unknown accuracy for the transmission electron microscope method.

Because of the many problems associated with the transmission electron microscope and other electron microscope methods, USEPA has yet to adopt a standard method for environmental fiber analysis, and this methodology most likely will not be available until such time as satisfactory answers to the precision and accuracy questions can be secured. In the interim, test results, such as the USEPA Test Results, obtained using electron microscopy must be viewed with some amount of skepticism, particularly insofar as attempts are made to relate them to possible health effects.

Regardless of these questions concerning the validity of the USEPA Test Results, the fact remains that these results do not indicate what the "background level" of asbestos is nor do they show that the level of asbestos emissions "significantly exceeds" background. Both of these indications must be present, according to the instructions to the HRS, before a score of 45 may be assigned to the rating factor "observed release." See 47 Fed. Reg. 31236 (July 16, 1982).

The upwind sample used for the USEPA Test Results may not be taken as being the "background level" of asbestos. As

has been discussed, there are too many questions concerning the method of sampling employed, the most significant of which is that the upwind sample was damaged, for the single sample to be considered to be a "background level." Moreover, a comparison of the upwind sample to the downwind sample cannot lead to a statistically valid conclusion of "significant" difference with the variation that has been documented in other studies.

Determination of a background level for emissions of asbestos is a very difficult task, as USEPA acknowledged in promulgating the NESHAP for asbestos.

> Satisfactory means of measuring ambient asbestos concentrations have only recently been developed, and satisfactory means of measuring asbestos emissions are still unavailable. Even if satisfactory means of measuring asbestos emissions did exist, the previous unavailability of a satisfactory means of measuring ambient levels of asbestos makes it impossible to estimate even roughly the quantitative relationship between asbestos-caused illness and the doses which caused those illnesses.

38 Fed. Reg. 8820 (April 6, 1973).*

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* USEPA maintained this position concerning the difficulty of measuring asbestos when it promulgated extensive amendments to the NESHAP, commenting once again on the

> impossibility at this time of prescribing and enforcing allowable numerical concentrations or mass emission limitations. One difficulty in prescribing a numerical emission standard is the relative inaccuracy of asbestos analytical methods.

(Continued on next page)

Because of these problems in measuring and comparing various levels of asbestos emissions, USEPA reached an accommodation of sort in finally setting an emission level in the NESHAP for asbestos: USEPA attempted to balance the view that "[i]t is probable that the effects of asbestos inhalation are cumulative; that is low-level and/or intermittent exposure to asbestos over a long time may be equally as important as high level and/or continuous exposure over a shorter period" with the view that "[o]n the other hand, the available evidence does not indicate that levels of asbestos in most community air cause asbestotic disease." Id. The compromise reached by USEPA was to select "no visible emissions" as the appropriate level of asbestos emissions to be allowed in the NESHAP on the theory that

> [t]aking both these considerations into account, the Administrator has determined that, in order to provide an ample margin of safety to protect the public health from asbestos, it is necessary

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(Continued from previous page)

> Dr. Arnold Brown, testifying in a recent court case involving asbestos emissions [United States et al. v. Reserve Mining Co. et al., 498 F.2d 1073, 1079 (8th Cir. 1974)] stated, 'It is reasonable to assume an error in the count of fibers in both water and air of at least nine times on the high side to one-ninth on the low side.' Further testifying on the same subject, Dr. Brown stated, '...I do not recall having been exposed to a procedure with an error this large, and which people have seriously proposed a number based on this very poor procedure.'

40 Fed. Reg. 48296 (Oct. 14, 1975).

> to control emissions from major man-made sources of asbestos emissions into the atmosphere, but that it is not necessary to prohibit all emissions.

Id.

These inherent difficulties in measuring and comparing various levels of asbestos emissions appear to preclude the application in any meaningful way of the HRS instructions concerning the "observed release" for the air route to releases of asbestos. The only standard of comparison which makes any useful attempt at conducting "an analysis of the probability and magnitude of harm to the human population or sensative environment from exposure to hazardous substances as a result of contamination of ground water, surface water, or air," 47 Fed. Reg. 31187 (July 16, 1982), to use the words of the preamble to the NCP, is the NESHAP for asbestos. Although this NESHAP is an emission standard,* it, nevertheless, was derived as a result of an analysis, albeit qualitative, of background levels and of the effect of asbestos on public health. Thus, it would be an appropriate guideline to use in evaluating the "observed

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* Johns-Manville Sales Corporation acknowledges that USEPA stated in the preamble to the HRS that "permitted releases of pollutants are not analogous to uncontrolled releases of hazardous substances" and declined to compare, when applying the HRS, emissions of hazardous substances to regulatory limits in order to determine whether or not an "observed release" had occurred. 47 Fed. Reg. 31188 (July 16, 1982). Johns-Manville Sales Corporation vigorously disagrees with this view and believes it to be improper. However, Johns-Manville Sales Corporation withholds further comment concerning it in deference to USEPA's request that comments submitted concerning the proposed National Priorities List not comment upon the HRS, itself. See 47 Fed. Reg. 58479 (Dec. 30, 1982).

release" to the air route when applying the HRS to emissions of asbestos.*

Under any of these analyses of the rating factor "observed release," however, the Waukegan facility should receive a value of 0 rather than the 45 it was assigned.

In addition to disagreeing with the value assigned to the rating factor "observed release", Johns-Manville Sales Corporation also disagrees with the evaluation of the rating factor "waste characteristics." One aspect of this factor is "toxicity." The documentation records note that the toxic compound evaluated in determining the "toxicity" aspect was asbestos and that it has a "Sax level" of 2. (page 12 of the documentation records portion of Attachment A). Elsewhere in the HRS score sheet and in the documentation records prepared for the Waukegan facility asbestos is described as having a "Sax level" of 3. Accordingly, "Toxicity" was evaluated incorrectly with respect to the air route portion of the HRS score sheet.

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* In addition to being an appropriate guideline for such an evaluation, the NESHAP for asbestos, indeed, may be the only guideline which may be applied. As discussed more fully in section C of these comments, infra, the NESHAP for asbestos was promulgated pursuant to Section 112 of the Clean Air Act. 42 U.S.C. §7412. To require compliance with some alternative standard for asbestos under the guise of the HRS and CERCLA may be to attempt to amend the NESHAP under a statute other than the Clean Air Act. Such an attempt would be impermissible.

4.
Significant Errors were
Committed in Preparing
the Direct Contact Work Sheet

The rating factor "containment" has been assigned a value of 15 (figure 12 of Attachment A), and, in support of this, the documentation records refer to "piles, not covered with proper cover material (i.e. - earthen material)." (page 14 of the documentation records portion of Attachment A). This evaluation of "containment" is incorrect. The instructions to the HRS explain that the term "containment" indicates whether "the hazardous substance itself is accessible to direct contact." 47 Fed. Reg. 31243 (July 16, 1982). As has been discussed, asbestos, the hazardous substance being evaluated, is not so accessible.

Waste asbestos placed in the on-site disposal area is managed as required by the NESHAP for asbestos: either there are "no visible emissions to the outside air," 40 C.F.R. §61.25(a) (1982), or the asbestos waste is covered, within twenty-four hours, with at least six inches of compacted, non-asbestos-containing material, 40 C.F.R. §61.25(e) (1982). The NESHAP for asbestos deems this mechanism to be an adequate means of containing asbestos. This evaluation should be adopted by the HRS as it was made after specific consideration of the properties and means of control of asbestos. Accordingly the state-

ment made in the instructions to the HRS that if "the hazardous substance at the facility is in... landfills with a cover depth of less than 2 feet...assign this rating factor a value of 15," 47 Fed. Reg. 31243 (July 16, 1982) should be viewed simply as a general directive which should be superceded by the much more specific declaration of the NESHAP for asbestos.

C.
EVEN IF THE HRS PROPERLY WAS APPLIED TO THE ON-SITE DISPOSAL AREA AT THE WAUKEGAN FACILITY, THE AREA SHOULD BE ELIMINATED FROM THE PROPOSED NATIONAL PRIORITIES LIST

The National Priorities List has been proposed to fulfill the directive of Section 105(8)(A) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 ("CERLA"), that a national contingency plan be prepared which, among other things, provides "criteria for determining priorities among releases or threatened releases throughout the United States for the purpose of taking remedial action and, to the extent practicable taking into account the potential urgency of such action, for the purpose of taking removal action." Id. The explicitly stated point of this evaluation is to provide the first step to the eventual remedy of removal of pollutants or contaminants. As such, USEPA has concluded that the evaluation should represent "for each release or potential release, an analysis of the probability and magnitude of harm to the human population or sensitive environment from exposure to

hazardous substances as a result of contamination of ground water, surface water, or air." 47 Fed. Reg. 31187 (July 16, 1982).

Such an analysis of the probability and magnitude of harm to the human population or sensitive environment from exposure to asbestos already has been made by USEPA under Section 112 of the Clean Air Act, 42 U.S.C. §7412, and need not be made again under CERCLA. The Clean Air Act mandates that USEPA establish standards for hazardous air pollutants "at the level which in his judgment [the Administrator of USEPA] provides an ample margin of safety to protect the public health from such hazardous air pollutant." 42 U.S.C. §7412(b)(1)(B). To accomplish this if "it is not feasible to prescribe or enforce an emission standard for control of hazardous air pollutant or pollutants, he [the Administrator of USEPA] may instead promulgate a design, equipment, work practice, or operational standard, or combination thereof, which in his judgment is adequate to protect the public health from such pollutant or pollutants with an ample margin of safety." 42 U.S.C. §7412(e)(1).

Pursuant to these dictates of the Clean Air Act, USEPA promulgated the NESHAP for asbestos as a comprehensive means of regulating, among other things, the collection, processing, packaging, transporting, and deposition of asbestos-containing waste materials. See 40 C.F.R. Part 61, Subpart B (1982). The

national emission standard for asbestos, which it established is that of "no visible emissions" coupled with certain prescribed operational practices.*

This standard takes into account the ambient levels of asbestos as well as the goal of protecting public health.

> It is probable that the effects of asbestos inhalation are cumulative: that is, low-level and/or intermittent exposure to asbestos over a long time may be equally as important in the etiology of asbestotic disease as high level and/or continuous exposure over a shorter period. On the other hand, the available evidence does not indicate that levels of asbestos in most community air cause asbestotic disease. Taking both these considerations into account, the Administrator has determined that, in order to provide an ample margin of safety to protect the public health from asbestos, it is necessary to control emissions from major man-made sources of asbestos emissions into the atmosphere but that it is not necessary to prohibit all emissions.

38 Fed. Reg. 8820 (April 6, 1973).

Accordingly, it is not necessary to undertake another analysis of ambient levels of asbestos or of the effect of exposure on human health or the environment of releases of asbestos

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* USEPA provided for alternative methods of compliance that represent what it considered to be "the best available disposal methods" in 40 C.F.R. 61.22(j) and (k) (1982). 40 Fed. Reg. 48296 (Oct. 14, 1975). "The Agency [USEPA] recognizes that the best available disposal methods for some of the sources may not be capable of preventing visible emissions during a minor portion of some of the disposal operations. Therefore, alternative methods of compliance that represent the best available disposal methods have been included in the regulations." Id.

under Section 105(8)(A) of CERCLA. This analysis already has been conducted pursuant to Section 112 of the Clean Air Act, 42 U.S.C. §7412, and has been embodied in the NESHAP for asbestos. If for some reason this evaluation is incorrect, it should be reevaluated under Section 112 of the Clean Air Act, a mechanism designed specifically to evaluate such problems, rather than under CERCLA.

It should be enough for purposes of Section 105(8)(A) of CERCLA if releases of asbestos are in compliance with the NESHAP for asbestos. Further, duplicative regulation under CERCLA is not warranted. Cf. 45 Fed. Reg. 78538 (Nov. 25, 1980) (USEPA declined to list asbestos as a hazardous substance under its Resource Conservation and Recovery Act ("RCRA") regulations, stating that "[c]ertainly, duplicative regulation should be avoided where possible. We therefore are temporarily deferring final promulgation of the listing of asbestos while we investigate further the relationship of the NESHAP and the RCRA management standards, and the extent to which NESHAP facilities afford comparable environmental protection in managing waste asbestos.").

To a certain degree, the NCP, itself, and the proposed National Priorities List, which it contains, recognize that such deference should be given to the Clean Air Act. Both of the regulations direct that no further action be taken with respect to releases of pollutants or contaminants when no reme-

dial actions are necessary. The NCP provides that inquiry into the release of a hazardous substance should be terminated when it is determined that the amount released does not warrant federal response, 47 Fed. Reg. 31214 (July 16, 1982) (to be codified in 40 C.F.R. §300.64(c)), and the preamble to the proposed National Priorities List contains as one of its criteria for deleting a site from the List, that USEPA, "in considering the nature and severity of the problems, the potential costs of cleanup, and available funds, has determined that no remedial actions should be undertaken at the site," 47 Fed. Reg. 58479 (Dec. 30, 1982). In effect, the NESHAP for asbestos already has made this determination of the need for remedial action by providing that emissions of asbestos which comply with its emission standards and operating procedures are to be allowed.

Therefore, even if the HRS properly was applied to the on-site disposal area at the Waukegan facility, the area should be eliminated from the proposed National Priorities List as it is in full compliance with the NESHAP for asbestos.

Sincerely,

JOHNS-MANVILLE SALES CORPORATION

By _____
Carolyn A. Lown

Of Counsel:
SCHIFF HARDIN & WAITE

7200 Sears Tower
Chicago, Illinois 60606
(312) 876-1000

One of Its Attorneys

Manville Corporation,
Waukegan, Illinois

The Manville site is located on the shoreline of Lake Michigan, north of Waukegan, Illinois. The problem area is a [illegible] acre-foot (a measure of volume usually used for water that is one acre by one foot in depth) waste pile into which are placed [illegible] asbestos wastes. Significant levels of asbestos have been found in [illegible] air samples. The Illinois Environmental Protection Agency has noted violations of the Illinois Environmental Protection Act regarding operation of the waste pile.

Further air sampling is required to determine the full extent of the air releases of asbestos. Studies to determine appropriate engineering or structural [illegible] may be required.

Attachment A

Facility name: [illegible] MANVILLE SITE

Location: WAUKEGAN, ILLINOIS

EPA Region: V

Person(s) in charge of the facility: [illegible] NIEDERGANG, ON-SCENE COORDINATOR

Name of Reviewer: [illegible] NIEDERGANG Date: [illegible] 12, 19[illegible]

General description of the facility:
(For example: landfill, surface impoundment, pile, container; types of hazardous substances; location of the facility; contamination route of major concern; types of information needed for rating; agency action, etc.)

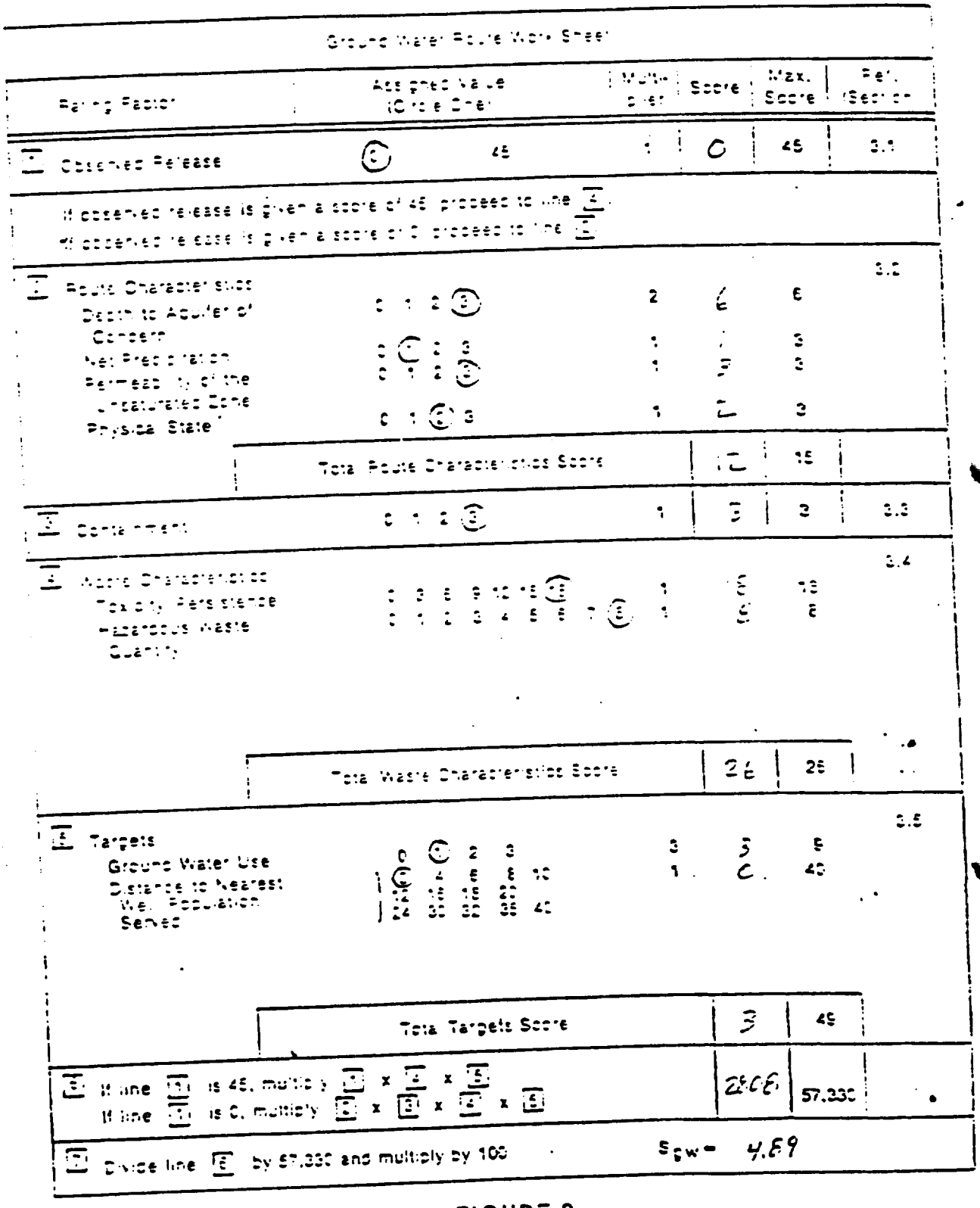
LANDFILL BORDERING LAKE MICHIGAN ON MANVILLE PROPERTY ON WHICH IS LOCATED [illegible] AND CONSOLIDATED ASBESTOS AND OTHER MANUFACTURING [illegible]. THE LANDFILL HAS BEEN IN USE SINCE ABOUT 1922

Scores: S_M = 38.31 (S_{gw} = 4.59 S_{sw} = 9.76 S_a = 65.38)

S_{FE} = 0

S_{DC} = 37.50

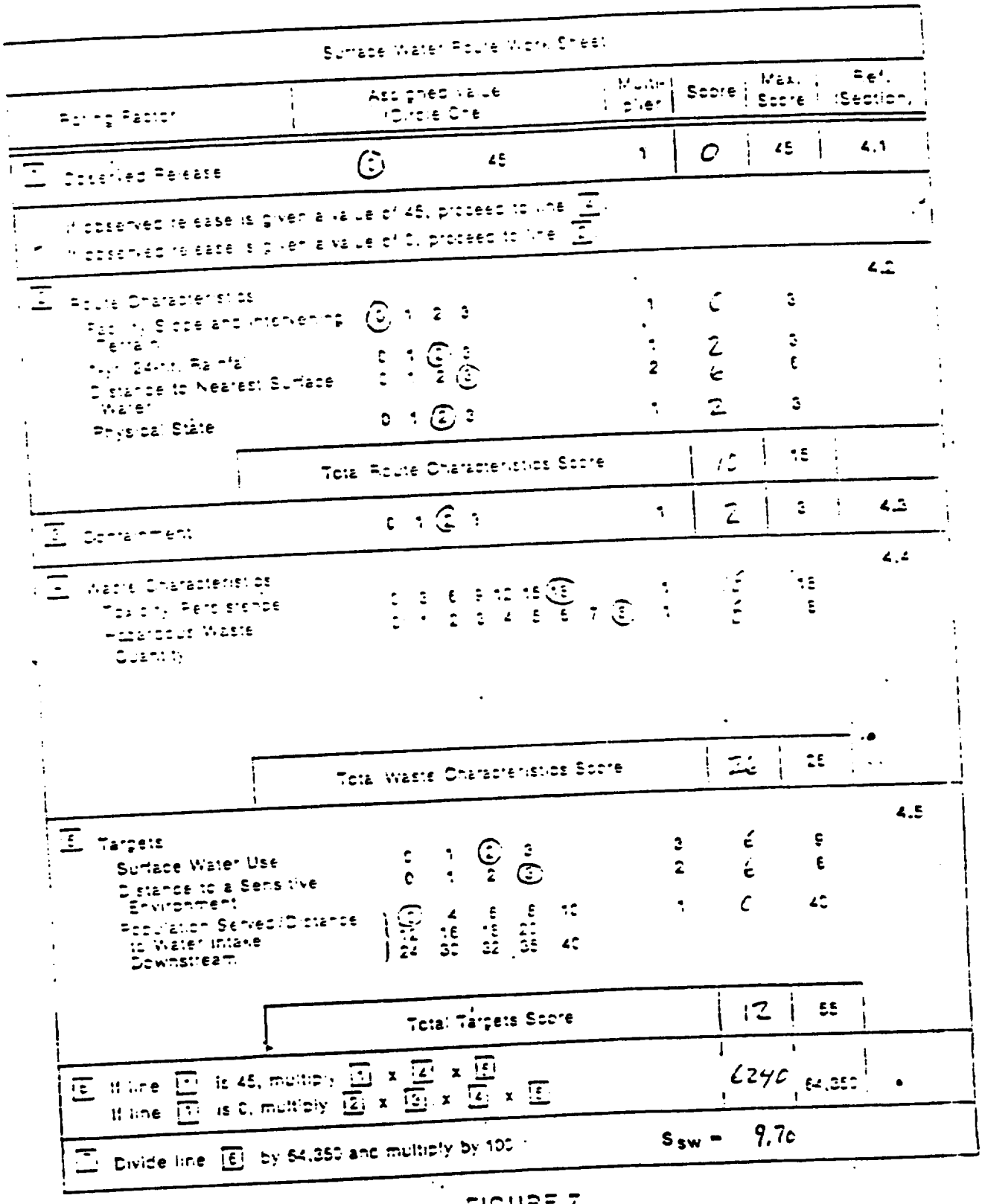
FIGURE 1
HRS COVER SHEET



Ground Water Route Work Sheet

Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
1 Observed Release	(0) 45	1	0	45	3.1
If observed release is given a score of 45, proceed to line 4. If observed release is given a score of 0, proceed to line 2.					
2 Route Characteristics					3.2
Depth to Aquifer of Concern	0 1 2 (3)	2	6	6	
Net Precipitation	0 (1) 2 3	1	1	3	
Permeability of the Unsaturated Zone	0 1 (2) 3	1	2	3	
Physical State	0 1 (2) 3	1	2	3	
Total Route Characteristics Score			10	15	
3 Containment	0 1 2 (3)	1	3	3	3.3
4 Waste Characteristics					3.4
Toxicity/Persistence	0 3 6 9 12 15 (18)	1	18	18	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 (8)	1	8	8	
Total Waste Characteristics Score			26	26	
5 Targets					3.5
Ground Water Use	0 (1) 2 3	3	3	9	
Distance to Nearest Well/Population Served	(0) 4 6 8 10 12 16 18 20 24 30 32 35 40	1	0	40	
Total Targets Score			3	49	
6 If line 1 is 45, multiply 2 x 4 x 5 If line 1 is 0, multiply 3 x 4 x 4 x 5			2808	57,330	
7 Divide line 6 by 57,330 and multiply by 100		S_{gw} =	4.89		

FIGURE 2
GROUND WATER ROUTE WORK SHEET



Surface Water Route Work Sheet

Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
1 Observed Release	(0) 45	1	0	45	4.1
If observed release is given a value of 45, proceed to line 4. If observed release is given a value of 0, proceed to line 2.					
2 Route Characteristics					4.2
Facility Slope and Intervening Terrain	(0) 1 2 3	1	0	3	
1-yr 24-hr Rainfall	0 1 (2) 3	1	2	3	
Distance to Nearest Surface Water	0 1 2 (3)	2	6	6	
Physical State	0 1 (2) 3	1	2	3	
Total Route Characteristics Score			10	15	
3 Containment	0 1 (2) 3	1	2	3	4.3
4 Waste Characteristics					4.4
Toxicity/Persistence	0 3 6 9 12 15 (18)	1	6	18	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 (8)	1	6	8	
Total Waste Characteristics Score			20	26	
5 Targets					4.5
Surface Water Use	0 1 (2) 3	3	6	9	
Distance to a Sensitive Environment	0 1 2 (3)	2	6	6	
Population Served/Distance to Water Intake Downstream	(0) 4 6 8 10 12 16 18 20 24 30 32 35 40	1	0	40	
Total Targets Score			12	55	
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5			6240	64,350	
7 Divide line 6 by 64,350 and multiply by 100			S_{sw} = 9.70		

FIGURE 7
SURFACE WATER ROUTE WORK SHEET

Air Route Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
1 Observed Release	0 (45)	1	45	45	5.1

Date and Location: 4/22/82 UPWIND, MIDSITE AND DOWNWIND

Sampling Protocol: 3 AIR SAMPLES COLLECTED AT ABOVE LOCATIONS ON [illegible] FILTERS, THEN [illegible] BY ELECTRON MICROSCOPY

If line 1 is 0, the $S_a = 0$. Enter on line 5.
If line 1 is 45, then proceed to line 2.

Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
2 Waste Characteristics					5.2
Reactivity and Incompatibility	(0) 1 2 3	1	0	3	
Toxicity	0 1 2 (3)	3	9	9	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 (8)	1	8	8	
Total Waste Characteristics Score			17	20	
3 Targets					5.3
Population Within 4-Mile Radius	0 9 12 15 18 (21) 24 27 30	1	21	30	
Distance to Sensitive Environment	0 1 2 (3)	2	6	6	
Land Use	0 1 2 (3)	1	3	3	
Total Targets Score			30	35	
4 Multiply 1 x 2 x 3			22950	35,100	
5 Divide line 4 by 35,100 and multiply by 100			S_a = 65.38		

FIGURE 9
AIR ROUTE WORK SHEET

	s	s^2
Groundwater Route Score (S_{gw})	4.89	23.91
Surface Water Route Score (S_{sw})	9.72	94.09
Air Route Score (S_a)	65.35	4270.54
$S_{gw}^2 + S_{sw}^2 + S_a^2$		4388.54
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		66.25
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} / 1.73 = S_M =$		38.2[illegible]

FIGURE 10
WORKSHEET FOR COMPUTING S_M

NOT APPLICABLE -

Fire and Explosion Work Sheet

Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
1 Containment	1 3	1		3	7.1
2 Waste Characteristics					7.2
Direct Evidence	0 3	1		3	
Ignitability	0 1 2 3	1		3	
Reactivity	0 1 2 3	1		3	
Incompatibility	0 1 2 3	1		3	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8	
Total Waste Characteristics Score				20	
3 Targets					7.3
Distance to Nearest Population	0 1 2 3 4 5	1		5	
Distance to Nearest Building	0 1 2 3	1		3	
Distance to Sensitive Environment	0 1 2 3	1		3	
Land Use	0 1 2 3	1		3	
Population Within 2-Mile Radius	0 1 2 3 4 5	1		5	
Buildings Within 2-Mile Radius	0 1 2 3 4 5	1		5	
Total Targets Score				24	
4 Multiply 1 x 2 x 3				1,440	
5 Divide line 4 by 1,440 and multiply by 100			SFE =		

FIGURE 11
FIRE AND EXPLOSION WORK SHEET

Direct Contact Work Sheet

	Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
1	Observed Incident	0 45	1	0	45	8.1
	If line 1 is 45, proceed to line 2 If line 1 is 0, proceed to line 3					
2	Access	0 1 2 (3)	1	3	3	8.2
3	Containment	0 (15)	1	15	15	8.3
4	Waste Characteristics (Toxicity)	0 1 2 (3)	5	15	15	8.4
5	Targets					8.5
	Population Within 1-Mile Radius	0 1 2 (3) 4 5	4	12	20	
	Distance to a Critical Habitat	(0) 1 2 3	4	0	12	

	Total Targets Score	12	32
6	If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5	8100	21,600
7	Divide line 6 by 21,600 and multiply by 100	SDC = 37.50	

FIGURE 12
DIRECT CONTACT WORK SHEET

DOCUMENTATION RECORDS
FOR
HAZARD RANKING SYSTEM

INSTRUCTIONS: The purpose of these records is to provide a convenient way to prepare an auditable record of the data and documentation used to apply the Hazard Ranking System to a given facility. As briefly as possible summarize the information you used to assign the score for each factor (e.g., "Waste quantity = 4,230 drums plus 800 cubic yards of sludges"). The source of information should be provided for each entry and should be a bibliographic-type reference that will make the document used for a given data point easier to find. Include the location of the document and consider appending a copy of the relevant page(s) for ease in review.

FACILITY NAME: JOHNS - MANVILLE

LOCATION: WAUKEGAN ILLINOIS (SEE BASIC SHEET) TABE

NOTE: THE WASTE DISPOSAL AREA IS LOCATED ON AN AREA WHICH HAS BEEN BUILT UP BY WASTES* ACCUMULATING SINCE ABOUT 1922 TO A HEIGHT OF APPROXIMATELY 50-60 FT. ABOVE THE NATURAL GROUND SURFACE. THEREFORE, ANY CITED REFERENCE WHICH DISCUSSES "LANDFILL" OR "LANDFILLED AREA" IS ACTUALLY REFERRING TO THE AREA WHICH HAS BEEN FILLED FROM THE NATURAL GROUND SURFACE UP TO A HEIGHT OF 50 TO 60 FT. TO THE BEST OF MY ESTIMATION, NO LANDFILLING HAS EVER OCCURED BELOW THE NATURAL GROUND SURFACE. THEREFO A MORE CORRECT WAY TO DESCRIBE THE METHOD OF DISPOSAL AT THIS SITE IS "WASTE PILE".
FURTHERMORE, CURRENT DISPOSAL OF FRIABLE ASBESTOS OCCURS IN AN EXCAVATED PIT ABOUT 150 FT. IN DIAMETER AND APPROXIMATELY 50 FT DEEP: FROM THE TOP OF THE BUILT UP AREA TO THE NATURAL GROUND SURFACE.

GROUND WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected (5 maximum):

— NO DOCUMENTED RELEASE —

Rationale for attributing the contaminants to the facility:

* * *

2 WASTE CHARACTERISTICS

Layer 1: Aquifer of Concern

Name/description of aquifer(s) of concern:

GROUNDWATER DISCHARGE ZONE (0-50 FEET BELOW NATURAL GROUND SURFACE),

(LETTER FROM ILLINOIS STATE GEOLOGICAL SURVEY TO ROBERT WINGDON DATED 2/23/78.)

Depth(s) from the ground surface to the highest seasonal level of the saturated zone (water table(s)) of the aquifer of concern:

TOP OF THE ZONE OF SATURATION IS AT OR NEAR THE NATURAL GROUND SURFACE.

(SEE LETTER REFERENCED ABOVE)

Depth from the ground surface to the lowest point of waste disposal/storage:

LOWEST POINT OF WASTE DISPOSAL/STORAGE IS AT THE NATURAL GROUND SURFACE (SEE pl. OF THIS FILE FOR FURTHER EXPLANATION)

Net Precipitation

Mean annual or seasonal precipitation (list months for seasonal):

MEAN ANNUAL PRECIPITATION = 32 INCHES

(FROM THE MODEL)

Mean annual lake or seasonal evaporation (list months for seasonal):

MEAN ANNUAL EVAPORATION = 30 INCHES

(FROM THE MODEL)

Net precipitation (subtract the above figures):

NET PRECIPITATION = + 2 INCHES

Permeability of Unsaturated Zone

Soil type in unsaturated zone:

SURFICIAL BEACH SAND WHICH IS DUNED AND MEDIUM GRAINED.

(FROM A LETTER FROM ILLINOIS STATE GEOLOGICAL SURVEY TO ROBERT WENGLICK DATED 2/23/78)

Permeability associated with soil type:

$> 10^{-3}$ cm/sec.

(FROM THE MODEL AND FREEZE & CHERRY, 1979, GROUNDWATER.)

Physical State

Physical state of substances at time of disposal (or at present time for generated gases):

FINE MATERIAL (FRIABLE ASBESTOS)

(IEPA DIVISION FILE MEMO FROM MARY SCHROEDER DATED 1/13/9

* * *

3 CONTAINMENT

Containment

Method of waste or leachate containment evaluated:

WASTE PILE

(SEE P1 OF THIS FORM FOR FURTHER EXPLANATION OF WASTE MANAGEMENT METHOD CHOSEN)

Method with highest score:

SINCE THE BOTTOM OF AREA IS LIKELY TO CONTAIN FRIABLE ASBESTOS WASTE AS WELL AS CONSOLIDATED ASBESTOS WASTE MATERIAL (FROM EARLY WASTE DISPOSAL TECHNIQUES) AND THE PILES ARE NOT GIVEN WITH AN APPROPRIATE COVER MATERIAL (RE-GRADED AND NO LINER REPORTEDLY EXISTS (= EPA DIVISION FILE MEMO FROM MARY SCHEC 4 WASTE CHARACTERISTICS DATED 2/8/80) - THIS WOULD RATE A (

Toxicity and Persistence

Constituent evaluated:

FRIABLE ASBESTOS

(MENTIONED ABOVE)

Constituent with highest score:

FRIABLE ASBESTOS / TOXICITY → SAX LEVEL 3

PERSISTENCE → HIGHLY PERSISTENT / LEVEL 3

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

(SEE ATTACHED MEMO)

Basis of estimating and/or computing waste quantity:

(SEE ATTACHED MEMO)

* * *

5 TARGETS

Ground Water Use

Use(s) of aquifer(s) of concern within a 3-mile radius of the facility:

NOT USED, BUT USABLE

(LETTER FROM IEPA TO ROBERT WENDROW DATED 2/22/78)

Distance to Nearest Well

Location of nearest well drawing from aquifer of concern or occupied building not served by a public water supply:

NONE

(LETTER CITED ABOVE)

Distance to above well or building:

- NOT APPLICABLE -

Population Served by Ground Water Wells Within a 3-Mile Radius

Identified water-supply well(s) drawing from aquifer s) of concern within a 3-mile radius and populations served by each:

NONE

(TOPOGRAPHIC MAP; CITY OF WAUKEGAN PUBLIC WORKS)

Computation of land area irrigated by supply well(s) drawing from aquifer(s) of concern within a 3-mile radius, and conversion to population (1.5 people per acre):

NONE

Total population served by ground water within a 3-mile radius:

NONE

SURFACE WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected in surface water at the facility or downhill from it (5 maximum):

— NONE DOCUMENTED —

Rationale for attributing the contaminants to the facility:

* * *

2 ROUTE CHARACTERISTICS

Facility Slope and Intervening Terrain

Average slope of facility in percent:

VARIES CONSIDERABLY, HOWEVER, SLOPE FROM TOP OF SITE TO NATURAL GROUND LEVEL IS ≥ 50%

(ON-SITE INSPECTION OBSERVATIONS BY ECOLOGY & ENVIRONMENT, INC - FIT PICTURES INCLUDED)

Name/description of nearest downslope surface water:

LAKE MICHIGAN

Average slope of terrain between facility and above-cited surface water body in percent:

~ 15 FT/800 TO 1000 FT = 1.5% TO 1.9% SLOPE

(ON-SITE INSPECTION OBSERVATIONS BY ECOLOGY & ENVIRONMENT, INC - FIT AND TOPO MAP MEASUREMENT)

Is the facility located either totally or partially in surface water?

NO

(ON-SITE INSPECTION BY ECOLOGY & ENVIRONMENT, INC (FIT))

Is the facility completely surrounded by areas of higher elevation?

NO

1-Year 24-Hour Rainfall in Inches

BETWEEN 2.0 TO 2.5 INCHES

(FROM MODEL)

Distance to Nearest Downslope Surface Water

4,000 FT.

DIRECT
(MEASUREMENT FROM TOPO MAP)

Physical State of Waste

FINE MATERIAL (FRIABLE ASBESTOS)

(SEE [illegible] OF THIS FORM FOR REFERENCE)

* * *

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

WASTE PILES

(SEE C.1. OF THIS FORM FOR FURTHER EXPLANATION OF WASTE MANAGEMENT METHOD CHOSEN)

Method with highest score:

SINCE THE BUILT UP AREA IS LIKELY TO CONTAIN FRIABLE ASBESTOS WASTE AS WELL AS CONSOLIDATED ASBESTOS WASTE MATERIAL (FROM EARLY WASTE DISPOSAL TECHNIQ. AND THE PILES ARE NOT COVERED WITH AN APPROPRIATE COVER MATERIAL (ie - EARTHEN MATER. AND THE CONTAINMENT / DIVERSION SYSTEM IS POTENT. UNSOUND (INADEQUATE COVER OF BUILT UP AREA) - THIS WOULD RATE A ②.

(IEPA LETTER FROM JOE PETRILLI TO J-M CORP DATED [illegible]
AND
[illegible] ON FILE [illegible] MR. SCH[illegible] DATED [illegible]

- WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated
FRIABLE
ASBESTOS

- SEE PAGE 5 FOR -

Compound with highest score
FRIABLE ASBESTOS

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0. Give a reasonable estimate even if quantity is only maximum.

UNKNOWN

Basis of estimating and or computing waste quantity.

- SEE PAGE 5 OF THIS FORM -

3 TARGETS

Surface Water Use

Use(s) of surface water within 3 miles downstream of the hazardous substance:

RECREATION - FISHING, BOATING, SWIMMING, ETC.

Is there tidal influence?

– NOT APPLICABLE –

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

– NOT APPLICABLE –

Distance to 5-acre (minimum) freshwater wetland, if 1 mile or less:

WETLANDS IMMEDIATELY ADJACENT TO SITE (<100 FT)

(TOPO MAP – WILLAMINA QUAD)

Distance to critical habitat of an endangered species or nations, within refuge, if 1 mile or less:

NONE KNOWN

Population Served by Surface Water

Location of all of water-supply intake(s) within 3 miles (free-flowing bodies) or 1 mile (static water bodies) downstream of the hazardous substance and population served by each intake:

NONE

NOTE: INTAKE LOCATED SEC. 22, T4SN, R3E IS ONLY USED 1-2 DAYS A YEAR AND ACCORDING TO TOM BARTHOLOMEW (FIT) THEREFORE IS NOT REPRESENTATIVE OF THE WATER SUPPLIED TO THE POPULATION ON A DAY-TO-DAY BASIS.

INTAKES SERVING THE POPULATION ARE WELL OUTSIDE THE 1-MILE PERSCRIBED RADIUS (STATIC WATER BODY

Computation of land area irrigated by above-cited intake(s) and conversion to population (1.5 people per acre):

NONE

Total population served:

NONE

Name description of nearest of above water bodies:

LAKE MICHIGAN

Distance to above-cited intakes, measured in stream miles.

[illegible] INTAKE LOCATED JUST OVER 4 MILES DOWNSTREAM

([illegible] MEASUREMENT - TOPO MAP, WAUKEGAN QUAD)

AIR ROUTE

1 OBSERVED RELEASE

Contaminants detected:

ASBESTOS

Date and location of detection of contaminants

[illegible] GROUND, ONSITE, AND DOWNWIND SAMPLES

Methods used to detect the contaminants:

[illegible] SAMPLES COLLECTED AT ABOVE LOCATIONS ON [illegible]. [illegible] FIELD THEN ANALYZED (FIBER COUNT) BY ELECTRON MICROSCOPE.

Rationale for attributing the contaminants to the site:

KNOWN ASBESTOS DISPOSAL SITE AND NATURE OF RELEASE COLLECTION METHOD.

* * *

2 WASTE CHARACTERISTICS

Reactivity and Incompatibility

Most reactive compound:

ASBESTOS → "0" (NFPA)

Most incompatible pair of compounds:

NO INCOMPATIBLE PAIRS

Toxicity

Most toxic compound:

FRIABLE ASBESTOS → SAX LEVEL 2

Hazardous Waste Quantity

Total quantity of hazardous waste:

UNKNOWN

Basis of estimating and/or computing waste quantity:

(SEE ATTACHED MEMO)

3 TARGETS

Population Within 4-Mile Radius

Circle radius used, give population, and indicate how determined:

(0 to 4 mi) 0 to 1 mi 0 to 1/2 mi 0 to 1/4 mi

CITY OF WAUKEGAN ALONE IS 67,000 PEOPLE ACCORDING TO THE 19[illegible] CENSUS WHICH HAS THE POPULATION IN THIS RADIUS. (SMALLER RADII EXCLUDE THE MAJOR POPULATION AREAS AND WOULD RESULT IN AN OVERALL LOWER SCORE.) - FROM TOPO MAP - WAUKEGAN QUAD. AN

Distance to a Sensitive Environment , CITY OF WAUKEGAN PLANNING DEPT.

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

NOT APPLICABLE

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

SEE p. 9 OF THIS ITEM

Distance to critical habitat of an endangered species, if 1 mile or less:

NONE KNOWN

Land Use

Distance to commercial industrial area, if 1 mile or less:

INDUSTRIAL AREA ADJACENT (1/4 MILE)

(AERIAL PHOTO; TOPO MAP-WAUKEGAN QUAD)

Distance to national or state park, forest, or wildlife reserve, if 1 miles or less:

ILLINOIS BEACH STATE PARK ADJACENT (1/4 MILE)

(TOPO MAP-WAUKEGAN QUAD)

Distance to residential area, if 1 miles or less:

RESIDENTIAL AREA (1/4 MILE)

(TOPO MAP-WAUKEGAN QUAD)

Distance to agricultural land in production within past 5 years, if 1 mile or less:

NONE

Distance to prime agricultural land in production within past 5 years, if 1 miles or less:

NONE

Is a historic or landmark site (National Register or Historic Places and National Natural Landmarks) within the view of the site?

NONE

OBSERVED INCIDENT

— NONE DOCUMENTED —

ACCESS [illegible]

AS PER [illegible] (FIT-SITE INSPECTION TEAM MEMBER) BARRIER AROUND SITE DOES NOT EXTEND ALONG THE ENTIRE EASTERN EDGE OF THE SITE (LAKESIDE) AND ACCESS IS POSSIBLE FROM THAT SIDE.

CONTAINMENT

PILES NOT COVERED WITH PROPER COVER MATERIAL (ie - EARTHEN MATERIAL) - PILES SUSPECT TO CONTAIN FRIABLE ASBESTOS DUE TO EARLY DISPOSAL [illegible]

WASTE CHARACTERISTICS - TOXICITY

FRIABLE ASBESTOS → SAX LEVEL 3

TARGETS

POPULATION (1-MILE RADIUS): [illegible] INDUSTRIAL AREA (WEST AND SOUTHWEST), [illegible] RESIDENTIAL AREA (WEST) PLUS [illegible] STRUCTURES [illegible] = [illegible] PEOPLE TOTAL [illegible] (FROM AERIAL PHOTO'S [illegible])

DISTANCE TO A CRITICAL HABITAT:

NO KNOWN ENDANGERED SPECIES

recycled paper

ecology and environment

Date: 4/28/88

Time: 1:19 A.M. (P.M.)

Photograph by:

Don Woods

EE-8203-2-03

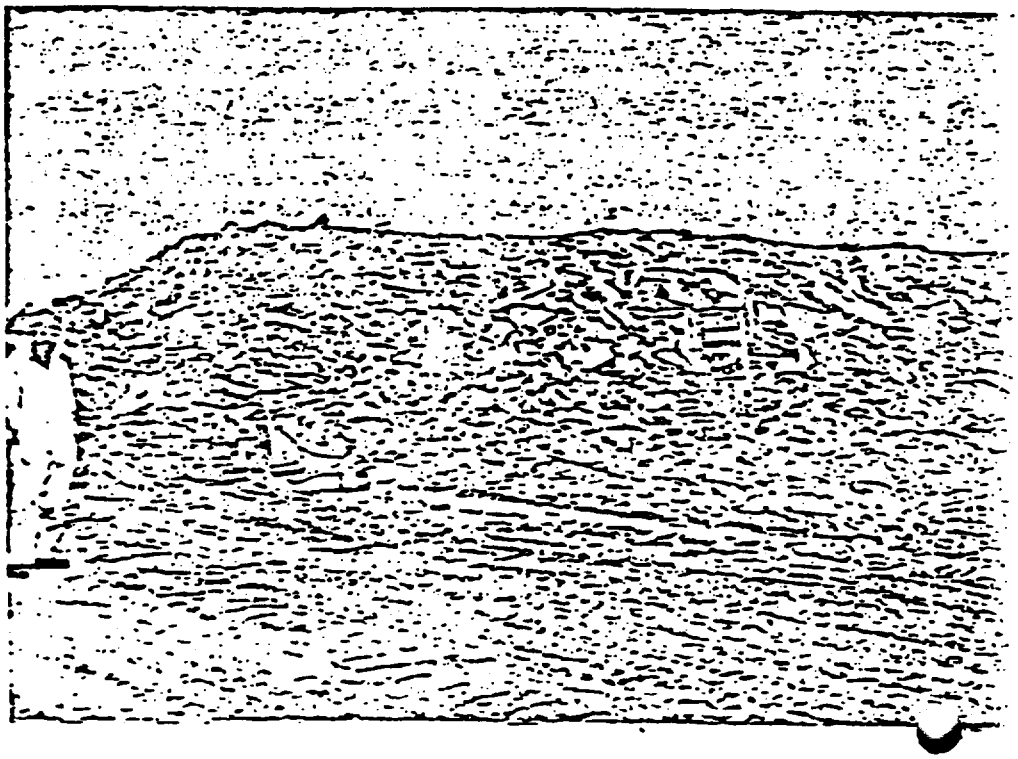
Re: Illinois Mine

Zion Waukegan

Notes: Photograph taken

of the West - Midsite

Tubes



Date: 4/28/88

Time: 1:17 A.M. (P.M.)

Photograph by:

Don Woods

EE-8203-2-03

Re: Illinois Mine

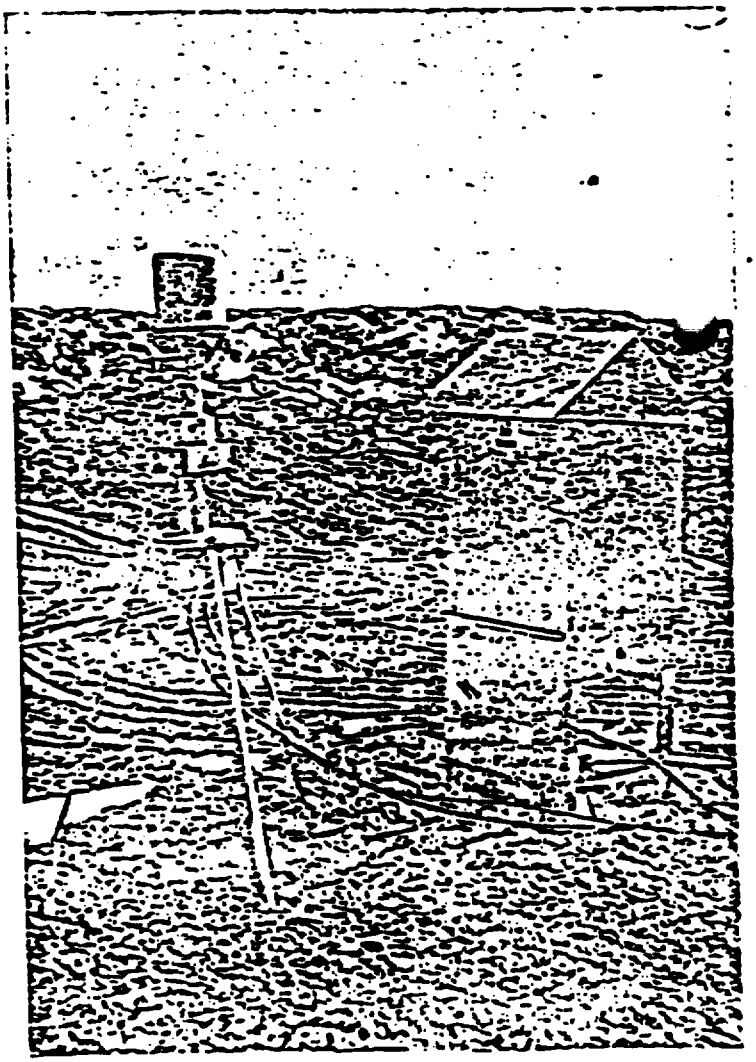
Zion Waukegan / Waukegan

Notes: Photograph taken

of the EAST - Midsite

Isokinetic Sampler on left

Vol Sampler Right (Zion Waukegan)



4/29/92

11:46 A.M.

graph By:

Don Woods

FS-9203-2-03

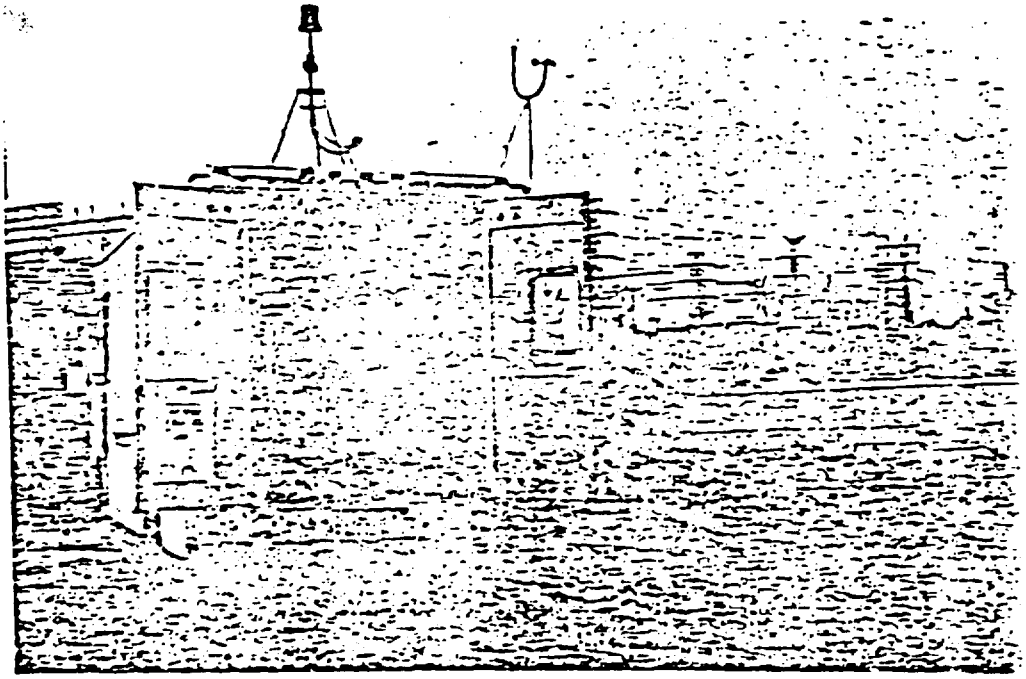
- Illinois Fire

ns Plainville/ Waukegan

ts: Photograph taken

e South

ward station



4/29/92

11:47 A.M.

ph By:

Don Woods

FS-9203-2-03

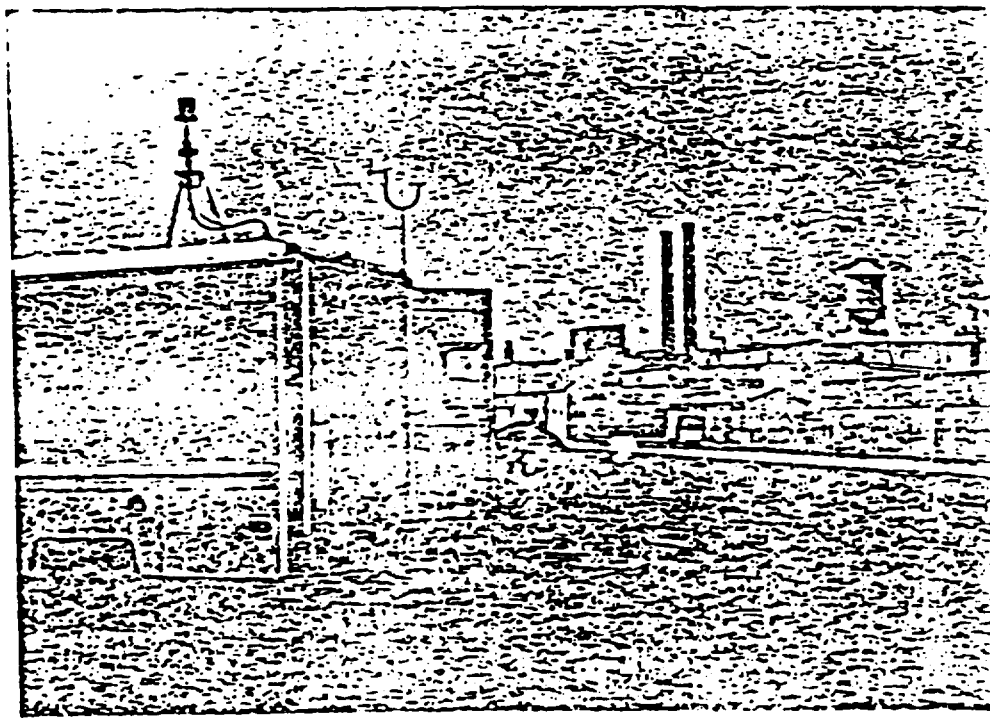
te- Illinois Fire

ns Plainville/ Waukegan

nts: Photograph taken

d the West

ward station



4/25/92

1:30 A.M. (P.M.)

tograph By:

Don Woods

EE-9203-2-03

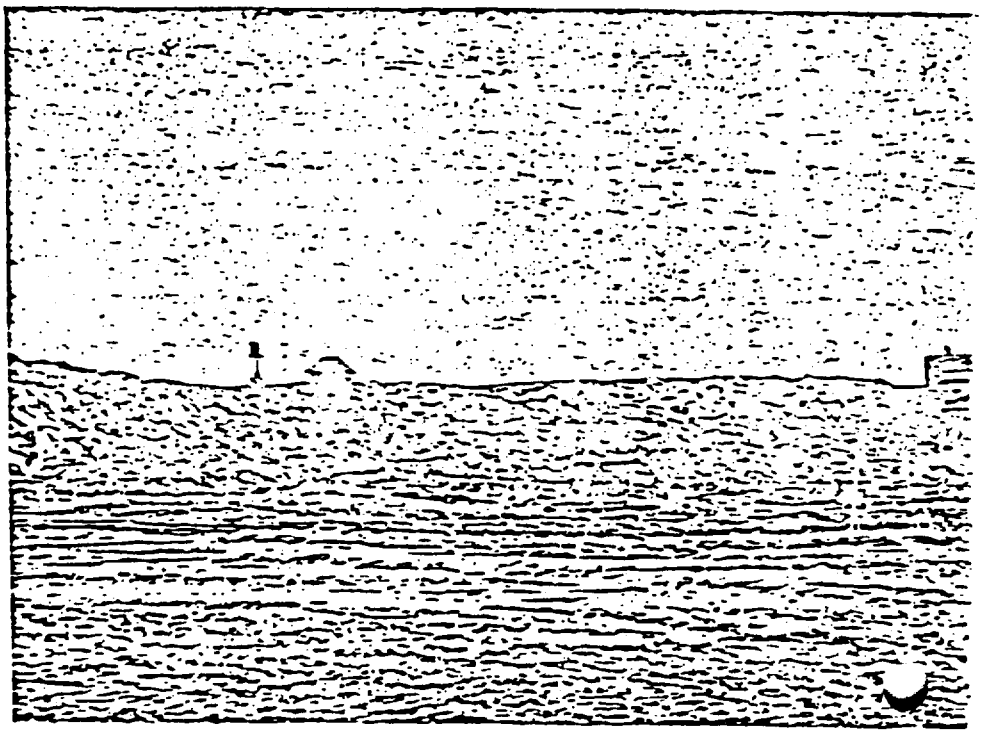
te- Illinois Mine

ohns Manville / Waukegan

ents: Photograph taken

rd the EAST of

Waste Stack



4/25/92

1:21 A.M. (P.M.)

tograph By:

Don Woods

EE-9203-2-03

ite- Illinois Mine

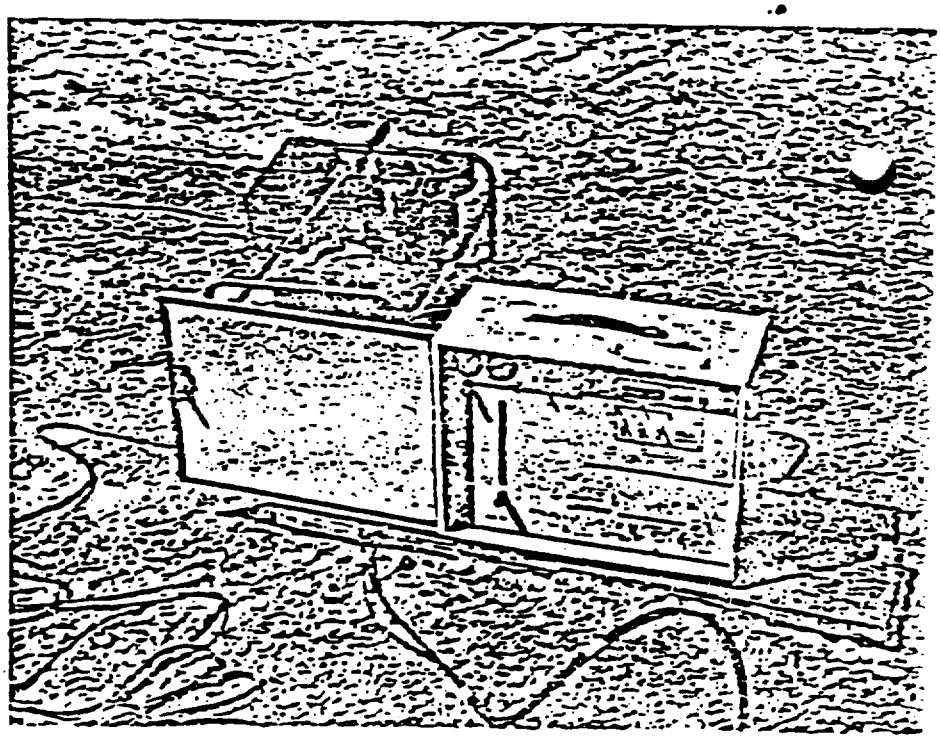
ohns Manville / Waukegan

ents: Photograph taken

rd the Close of Waste

Isokinetic Sampler pump

and Controller



4/28/82

1:25 A.M.

Photograph By:

Don Woods

FS-8203-2-03

Re: Illinois Nitre

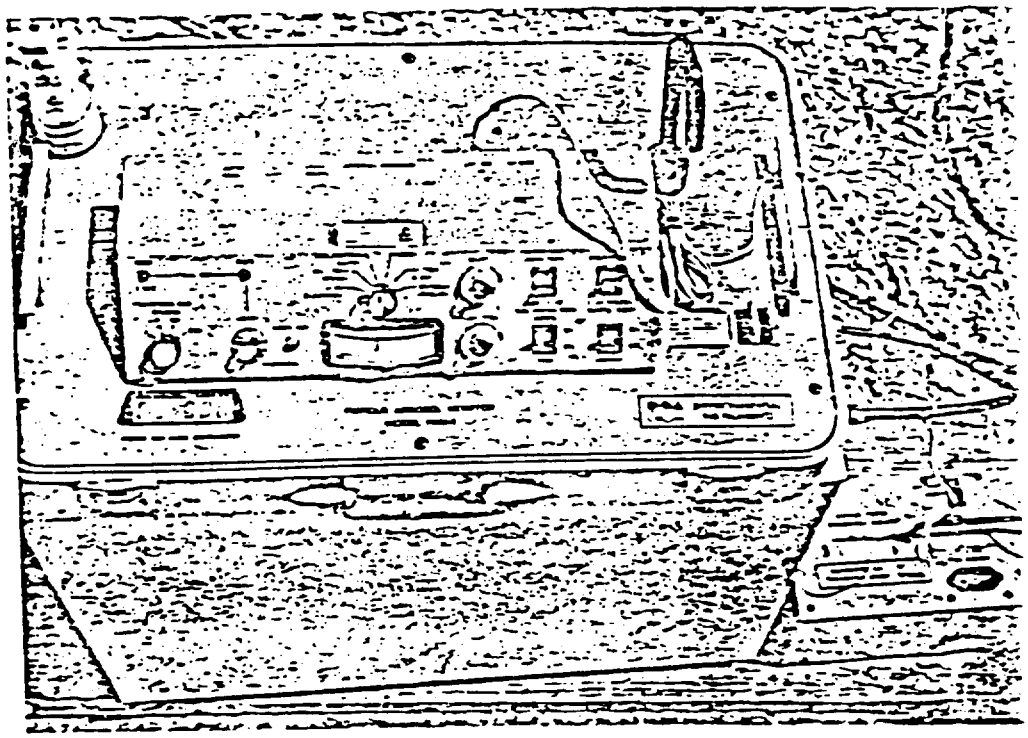
and Handle / Waukegan

Notes: Photograph taken

the Close up @ Midsite

Station - Feat-1 (Fibrous

Rock Mantle)



4/28/82

1:26 A.M.

Photograph By:

Don Woods

FS-8203-2-03

Re: Illinois Nitre

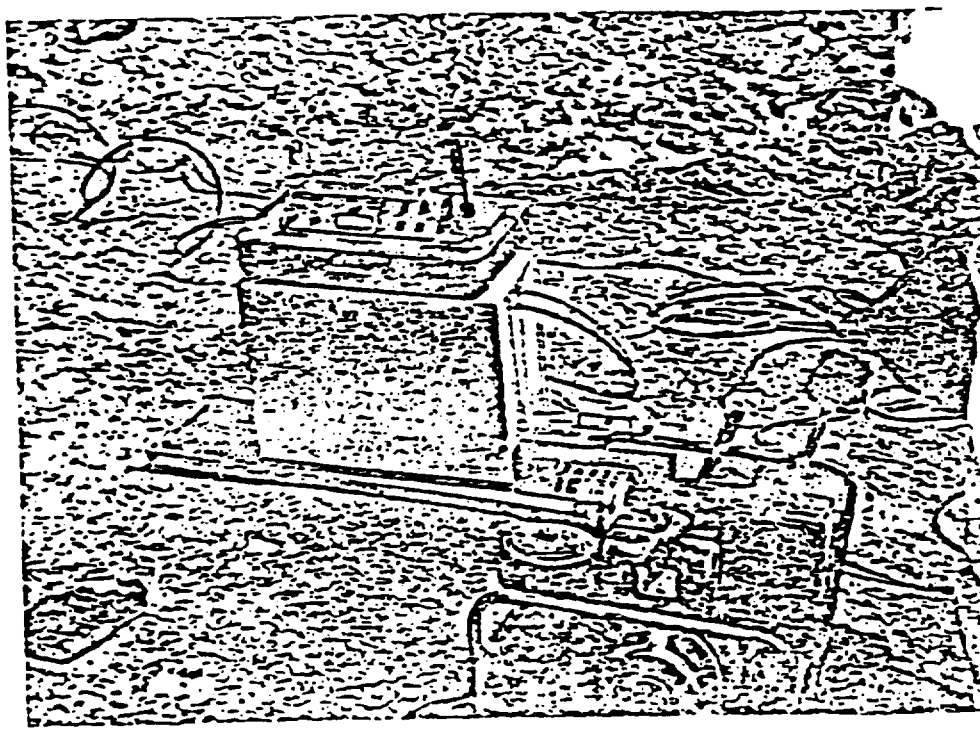
and Handle / Waukegan

Notes: Photograph taken

of the Refueling 3-KW

Generator @ Midsite

Station



4/25/82

1:10 A.M. (P.M.)

graph By:

Don Woods

ES-8203-2-03

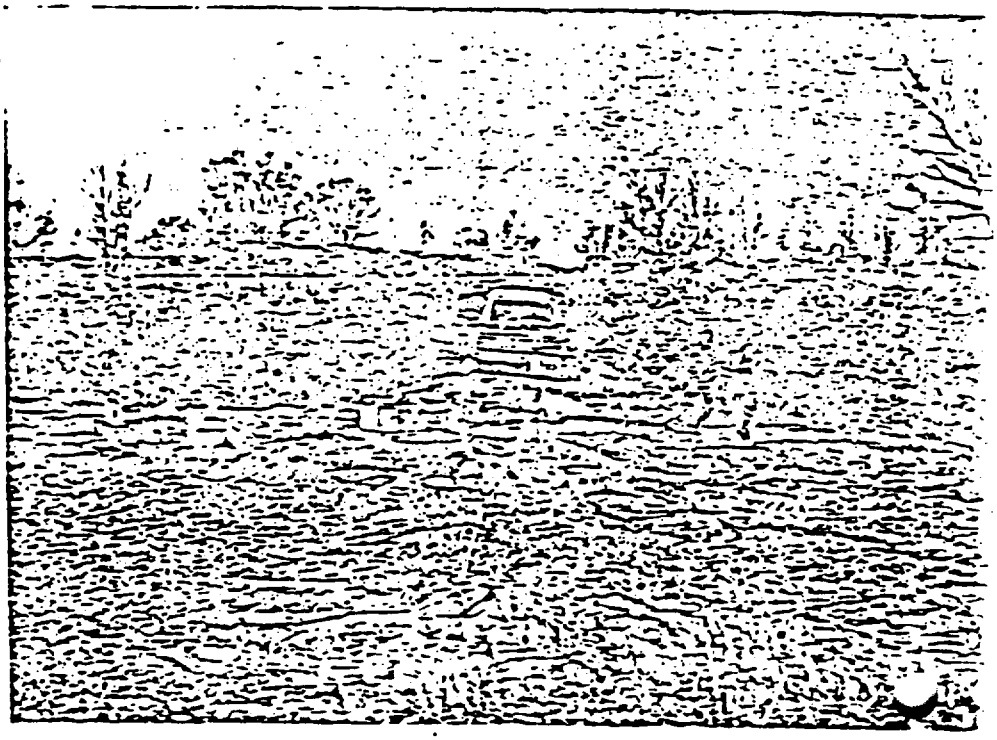
te- Illinois

Ins Harbor/ Waukegan

ents: Photograph taken

rd the West

Pulling STATION



4/25/82

8:15 A.M. (P.M.)

ograph By:

Don Woods

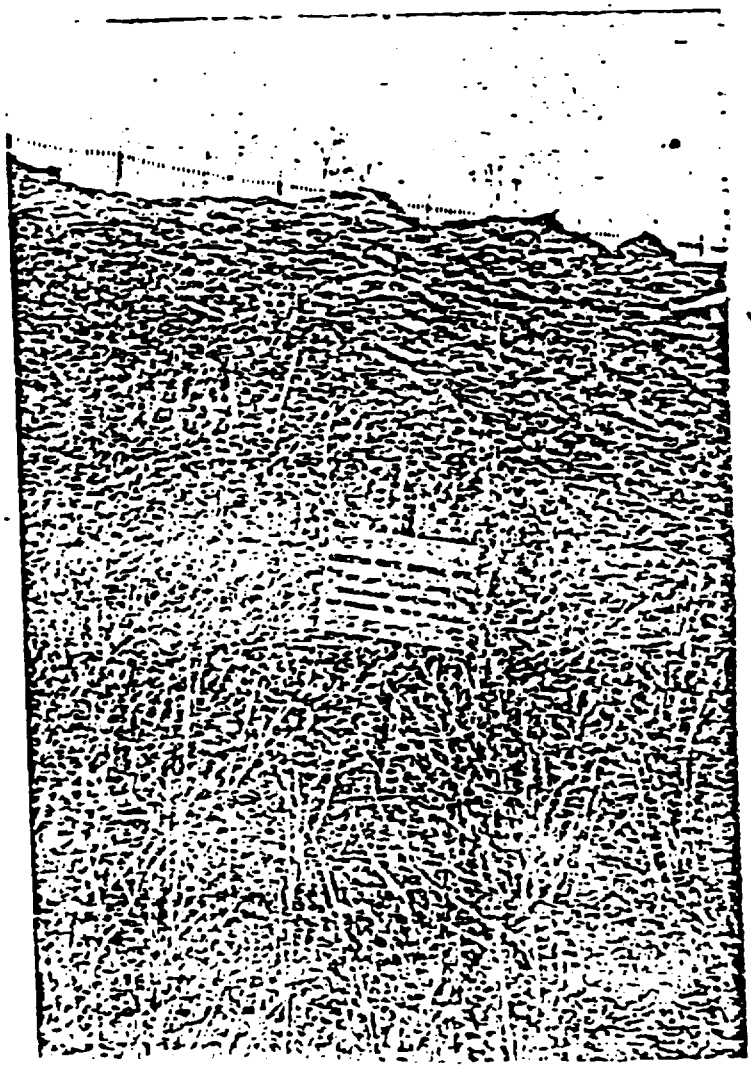
ES-8203-2-03

te- Illinois Illinois

Ins Harbor / Waukegan

ents: Photograph taken

rd the North



: 5/25/82

: 8:35 (A.M.) P.M.

graph By:

Don Lozen

: F5-8203-2-13

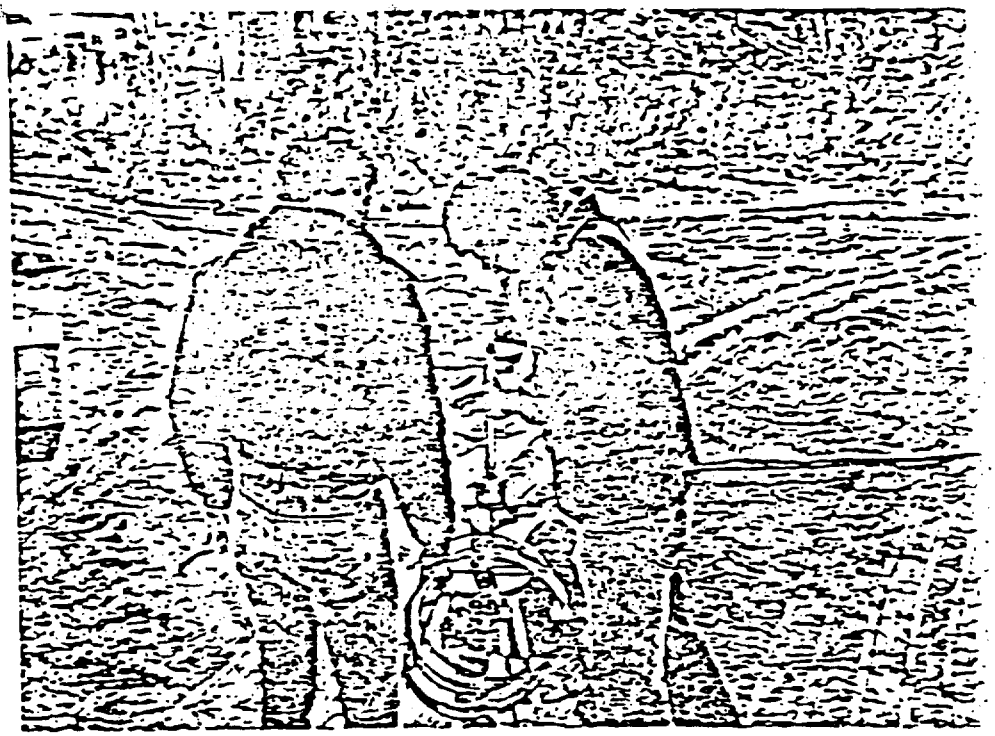
te- Illinois Nitro

ns Marseilles Michigan

ents: Photograph taken

the EAST

Setting up Sampler



: 4/26/82

: 1:05 A.M. (P.M.)

graph By:

Don Woods

: F5-8203-2-03

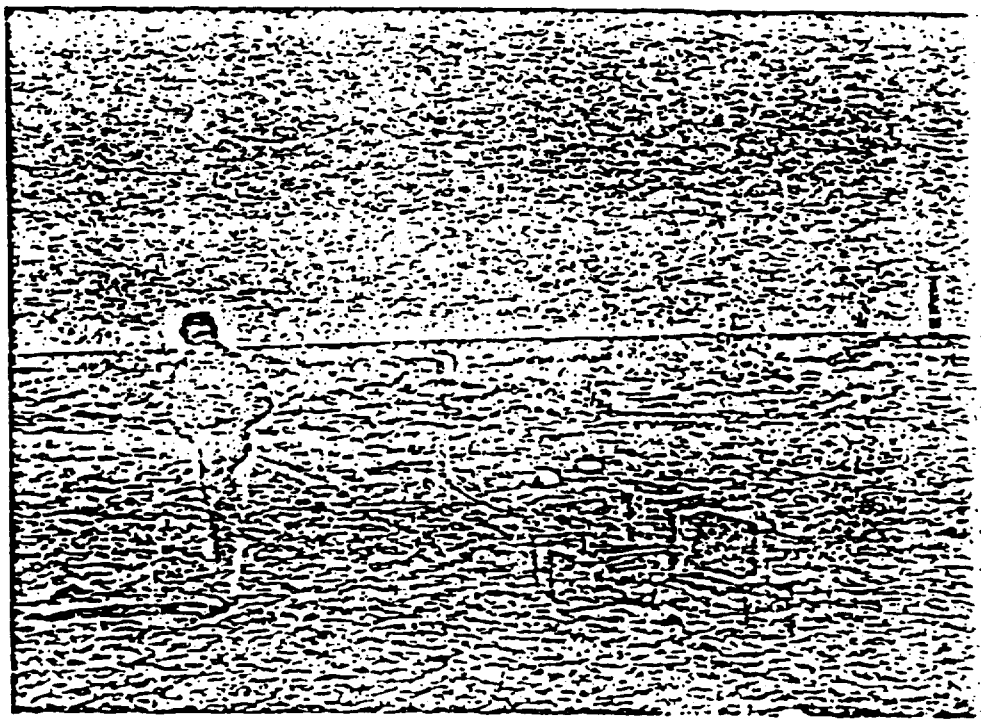
te- Illinois Nitro

ns Marseilles/ Michigan

ents: Photograph taken

d the EAST

pwind STATION



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

DATE 12 AUG 1982

SUBJECT Calculation of waste volume for Manville Site, Waukegan, Illinois

FROM Norman Niedergang
Environmental Engineer

TO: File

Three alternative techniques have been used to calculate the waste quantity at the above subject site:

1. Landfill capacity (per the facility Part A RCRA Permit Application)

   =600 ac. ft. = 96,800 cu. yd.

   This would score an 8 by the HRS.

2. Waste generation volume (per the facility Part A RCRA Permit Application)

   = 5 tons/yr. x 60 yrs. = 300 tons

   This would score a 5 by the HRS.

3. Landfill volume using physical description which includes a 50 ft. height with 2:1 sideslopes:

   = 19390 cu. yd.

   This would score an 8 by the HRS.

Based on the above, I have assigned a score of 8 for the waste quantity.

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION V
111 West Jackson Blvd.
CHICAGO ILLINOIS 60604

REPLY TO ATTENTION OF
5HR-TUB

SEP 17 1982

James N. Siegfield, Manager
Community Environmental Standards
Manville Service Corporation
Ken-Caryl Ranch, P.O. Box 5108
Denver, Colorado 80217

Dear Mr. Siegfield:

This is in response to your letter dated May 21, 1982, to Michael O'Toole of this office in which you requested certain information collected by the United States Environmental Protection Agency (U.S. EPA) concerning your industrial landfill site in Waukegan, Illinois.

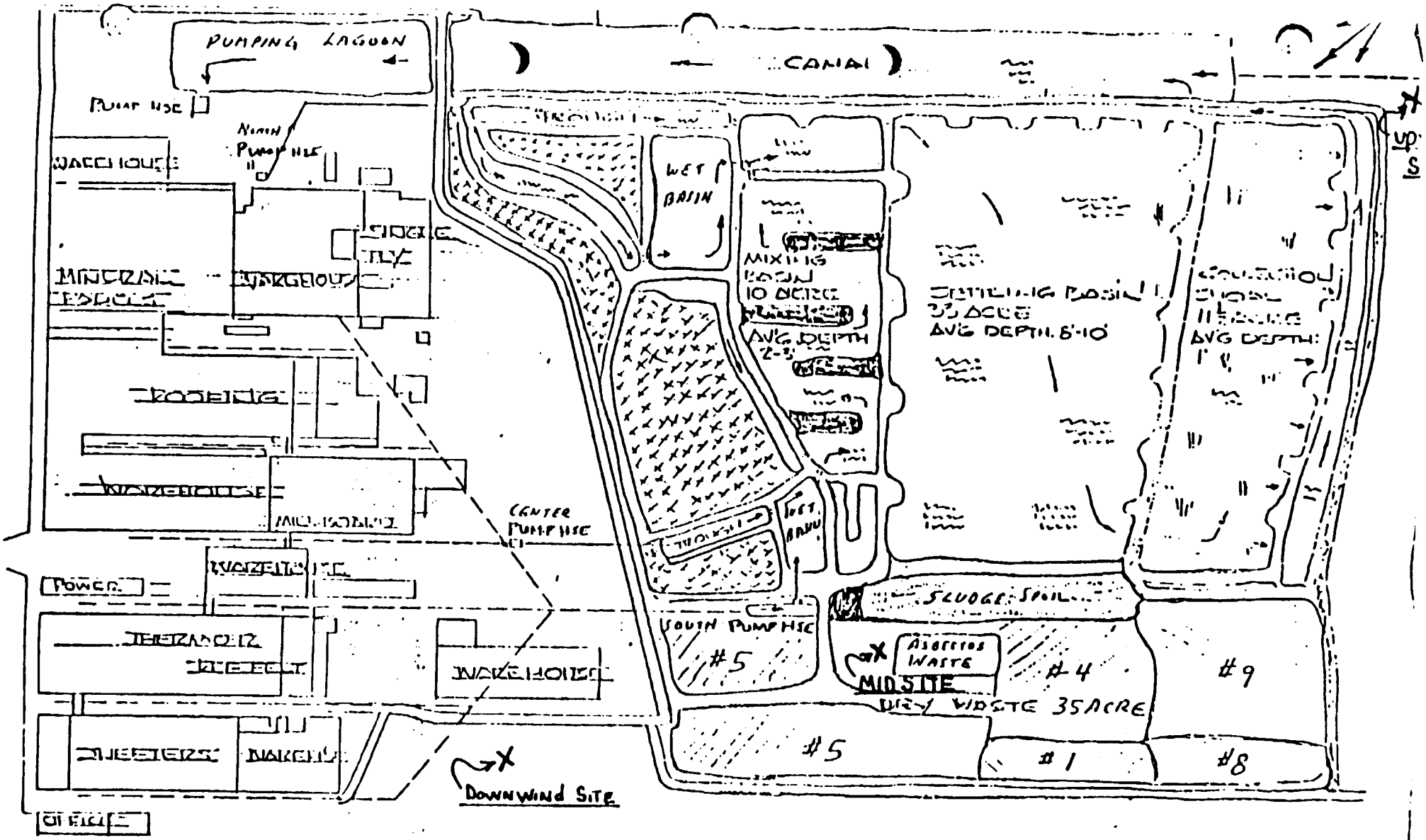
Pursuant to your request, I am enclosing the results of air sampling conducted at your Waukegan facility by the U.S. EPA on April 28, 1982. The remaining information which you requested will be provided to you when finalized.

Very truly yours,

Norman Niedergang, P.E.
Environmental Engineer

Enclosure

Attachment B



AIRBORNE ASBESTOS SAMPLING LOCATI[redacted]

4/28/82 DBW

MANUFACTURING SEWER LINES & WET-D
WASTE DISPOSAL AREAS

DR BY WB	DATE 7-7-[illegible]

JOHNS-MANVILLE
WAUKEGAN, IL

DWG [illegible]

EMS LABORATORIES INC.
Contract Lab

21619	EXHAUST AIR	BLANK
Sample Number	Industrial Category	Sample Point Description
5-29-92	4289	4196
Date Analyzed	Blank Number	Standard Number

ANALYSIS INFORMATION:

Detection Limit: 15 Fibers per mm^2

Ashed sample X yes ___ no

Amount of Air Filtered: 0 (BLANK) cubic meters

Fields Examined 20

Total Filter Area 960 mm^2

Chrysotile Fibers (all sizes): 1

Chrysotile Concentration:

Calculated Mass NA ng/m^3

Calculated Fibers NA $fibers/cc^3$

SCC USE ONLY

DATA INTERPRETATION

___ Shows positive indication of chrysotile asbestos in the ambient air.

___ Shows no indication of chrysotile asbestos in the ambient air.

___ Cannot be interpreted because of the limited number of chrysotile fibers counted.

JUN 1 6 1982

Effluent Guidelines Division

ASBESTOS DATA REPORT

EPA Sample No: A1619
Industrial Category: BLANK
Page 1 of 2

SAMPLE DATA

Laboratory: EMS LABORATORIES INC
Lab ID Number: 4223
Date analyzed: 5-29-82
Analyst: P TROPER
Filter Type: 0.1 nucleopore
Preparation technique: modified Jaffe Wick
Method of counting: grid square
Volume of field sample filtered: None

OPERATING CONDITIONS

Mode: TEM
Beam current μA: 25
Sample tilt (°): 0°
Actual screen magnification: x 20,000
Av. grid area (mm²): 0.0072 mm²
No. of grid squares counted: 20
Address for grid storage: [illegible] DATE

GRID NUMBER I, II, III, IV (circle one)

RE ER	FIBER NUMBER	CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION: CHRYSOTILE	OTHER FIBERS (NON-CHRYSOTILE)	AMBIGUOUS PATTERN	NO SAED PATTERN	POSSIBLE EXDRA ID	FIBER SIZE: (mm) DIAMETER	(mm) LENGTH	ASPECT RA
2	1									
	2	✓	✓					1	42	42
0	3									
	4									
	5									
	6									
	7									
	8									
	9									
	10									
	11									
	12									
	13									
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									
	25									
TOTALS		1	1	0	0	0				

USE ADDITIONAL PAGES FOR COMMENTS, IF NECESSARY

ASBESTOS DATA REPORT
(cont'd)

EPA Sample No: R1619
Industrial Category: EXPANDED
Page 2 of 2

GRID NUMBER: I, (II), III, IV (circle one)

E R	FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION: (✓) CHRYSOTILE	(✓) OTHER FIBERS (NON CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN	POSSIBLE EXOTRAID	FIBER SIZE: (mm) DIAMETER	(mm) LENGTH	ASPECT R
)	1									
	2			✓				1.5	10	6.7
)	3									
	4									
	5									
	6									
	7									
	8									
	9									
	10									
	11									
	12									
	13									
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									
	25									
TALS		0	0	1	0	0				
LATIVE TOTALS		1	1	1	0	0				

MMENTS:

DATA SUMMARY SHEET

JUN 16

EMS LABORATORIES INC.
Contract Lab

A1413	AMBIENT AIR	UPWIND (COARSE)
Sample Number	Industrial Category	Sample Point Description

5-24-82	4289	4196
Date Analyzed	Blank Number	Standard Number

ANALYSIS INFORMATION:

Detection Limit: 15 Fibers per mm^2

Asbestos sample X yes ___ no

Amount of Air Filtered: 0.685 cubic meters

Fields Examined 20

Total Filter Area 960 mm^2

Chrysotile Fibers (all sizes): 33

Chrysotile Concentration:

Calculated Mass 38 ng/m^3

Calculated Fibers 0.7 $fibers/cc^3$

SCC USE ONLY

DATA INTERPRETATION

___ Shows positive indication of chrysotile asbestos in the ambient air.

___ Shows no indication of chrysotile asbestos in the ambient air.

___ Cannot be interpreted because of the limited number of chrysotile fibers counted.

Effluent Guidelines Division

ASBESTOS DATA REPORT

EPA Sample No: A1613
Industrial Category: AMBIENT AIR
Page 1 of 6

JN 1 6 1982

SAMPLE DATA

Laboratory: EMS LABORATORIES INC
Lab ID Number: 12341
Date analyzed: 5-24-82
Analyst: B TOOPER
Filter Type: 0.1 μ nucleopore
Preparation technique: modified Jaffe Wick
Method of counting: grid square
Volume of field sample filtered: 0.685

OPERATING CONDITIONS

Mode: TEM
Beam current μA: 35
Sample tilt (°): 0°
Actual screen magnification: x 20,000
Av. grid area (mm²): 0.00127
No. of grid squares counted: 100
Address for grid storage: [illegible]

GRID NUMBER: (I) II, III, IV (circle one)

ARE BER	(✓) FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION				POSSIBLE EXTRA ID	FIBER SIZE		ASPECT RAT
			(✓) CHRYSOTILE	(✓) OTHER FIBERS (NON-CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN		(mm) DIAMETER	(mm) LENGTH	
	1	✓	✓					2	10	5
	2	✓	✓					1.5	14	9.3
	3			✓				2.5	11	4.4
	4	✓	✓					1.5	16	10.6
	5	✓	✓					1	14	14
	6	✓	✓					1	12	12
	7			✓				1	8	8
	8	✓	✓					2	23	11.5
	9	✓	✓					1.5	9	6
	10	✓	✓					2.5	102	40.8
	11			✓				2.5	14	5.6
	12					✓		1.5	10	6.7
	13	✓	✓					1.5	18	12
	14	✓	✓					1.5	25	16.7
	15	✓	✓					1.5	23	15.3
	16	✓	✓					1	25	25
	17				✓			1	18	18
	18	✓	✓					1	67	6.7
	19	✓	✓					1	22	22
	20			✓				2	8	4
	21			✓				3	28	9.3
	22			✓				1.5	10	6.7
	23				✓			1.5	15	10
	24	✓	✓					1.5	12	8
	25	✓	✓					1	40	40
	TOTALS	16	16	6	2	1				

USE ADDITIONAL PAGES FOR COMMENTS, IF NECESSARY

ASBESTOS DATA REPORT
(cont'd)

EPA Sample No: A1613
Industrial Category: AMBIENT AIR
Page 2 of 6

GRID NUMBER (I) II, III, IV (circle one)

RE ER	(✓) FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION: (✓) CHRYSOTILE	(✓) OTHER FIBERS (NON CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN	POSSIBLE EXPRAID	FIBER SIZE: (mm) DIAMETER	(mm) LENGTH	ASPECT
AT.	1			✓				1	12	12
	2	✓	✓					1	10	10
	3	✓	✓					1	12	12
	4	✓	✓					1	7.3	7.3
	5					✓		1.5	40	26.7
	6	✓	✓					1	14	14
	7	✓	✓					2	13	6.5
	8	✓	✓					1.5	13	8.7
	9	✓	✓					1	13	13
	10	✓	✓					1	14	14
	11			✓				3	14	4.7
	12	✓	✓					1	40	40
	13	✓	✓					1	38	38
	14			✓				1	11	11
	15	✓	✓					1	47	47
	16			✓				2.5	12	4.8
	17	✓	✓					2	17	8.5
	18			✓				2	40	20
	19			✓				1	14	14
	20	✓	✓					2	60	30
	21	✓	✓					1.5	20	13.3
	22	✓	✓					2	50	25
	23	✓	✓					1.5	40	26.7
	24	✓	✓					2	10	5
	25	✓	✓					1.5	14	9.3
OTALS		13	18	6	0	1				
ULATIVE TOTALS		34	34	12	2	2				

MMENTS:

(cont'd)

EPA Sample No: A16.15
Industrial Category: AMBIENT AIR
Page 3 of 6

GRID NUMBER: I, II, III, IV (circle one)

...RE ...BER	FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION: (✓) CHRYSOTILE	(✓) OTHER FIBERS (NON CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN	POSSIBLE ASBESTOS	FIBER SIZE: (mm) DIAMETER	(mm) LENGTH	ASPECT
...T.	1	✓	✓					.15	20	1.3
	2									
	3									
	4									
	5									
	6									
	7									
	8									
	9									
	10									
	11									
	12									
	13									
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									
	25									
TOTALS		1	1	0	0	0				
MULATIVE TOTALS		35	35	12	2	2				

OMMENTS:

ASBESTOS DATA REPORT
(cont'd)

EPA Sample No: A1613
Industrial Category: AMBIENT AIR
Page 4 of 6

GRID NUMBER: I (II) III, IV (circle one)

ARE IBER	FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION: (✓) CHRYSOTILE	(✓) OTHER FIBERS (NON-CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN	POSSIBLE EXTRA ID	FIBER SIZE: (mm) DIAMETER	(mm) LENGTH	ASPECT
	1			✓				.21	.176	11.5
	2	✓	✓					.1	.16	16
	3				✓			.1	.121	1.2
	4	✓	✓					.1	.30	30.
	5			✓				.1	.9	9
	6	✓	✓					.1	.10	10
5	7	✓	✓					.1	.27	27
	8			✓				.2	.10	5
	9			✓				.5	.38	7.6
	10	✓	✓					.1	.8	8
3)	11			✓				.1	.8	8
	12			✓				.15	.24	16
	13	✓	✓					.1	.18	18
	14			✓				.15	.10	6.7
	15			✓				.3	.12	4.1
	16	✓	✓					.15	.11	7.3
	17	✓	✓					.02	.152	7.6
	18	✓	✓					.1	.63	16
	19	✓	✓					.2	.56	28
	20	✓	✓					.6	.58	9.7
+)	21	✓	✓					.1	.9	9
	22	✓	✓					.3	.30	10
	23	✓	✓					.1	.16	16
	24			✓				.3	.10	3.3
	25	✓	✓					.1	.17	17
TOTALS		15	15	9	1	0				
CUMULATIVE TOTALS		50	50	21	3	2				

COMMENTS:

ASBESTOS DATA REPORT (cont'd)

EPA Sample No: A1613
Industrial Category: AMBIENT AIR
Page 2 of 2

GRID NUMBER: I (II) III, IV (circle one)

SQUARE NUMBER	FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION: (✓) CHRYSOTILE	(✓) OTHER FIBERS (NON CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN	POSSIBLE EXTRA ID	FIBER SIZE: (mm) DIAMETER	(mm) LENGTH	ASPECT
last	1			✓				.2	.14	7
2	2	✓	✓					.3	.3+1	11+
	3			✓				.2	.12	6
	4	✓	✓					.15	.10	6.7
	5	✓	✓					.15	.20	13.3
	6			✓				.3	.9	3
	7	✓	✓					.1	.30	30
	8	✓	✓					.15	.9	6
	9	✓	✓					.1	.21	21
	10	✓	✓					.1	.12	12
	11	✓	✓					.1	.17	17
	12	✓	✓					.1	.16	16
	13			✓				.2	.22	11
	14	✓	✓					.1	.14	14
3	15	✓	✓					.15	.15	10
	16	✓	✓					.1	.34	34
	17				✓			.1	.10	10
	18	✓	✓					.1	.20	20
	19			✓				.3	.13	4.3
	20	✓	✓					.1	.12	12
	21					✓		.1	.11	11
	22	✓	✓					.15	.15	10
3	23					✓		.1	.14	14
	24			✓				.2	.15	7.5
	25	✓	✓					.2	.25	13
TOTALS		16	16	6	1	2				
CUMULATIVE TOTALS		66	66	27	11	11				

COMMENTS:

ASBESTOS DATA REPORT
(cont'd)

EPA Sample No 11613
Industrial Category AMBIENT AIR
Page 6 of 6

GRID NUMBER: I, II, III, IV (circle one)

SHARE FIBER	FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION: (✓) CHRYSOTILE	(✓) OTHER FIBERS (NON-CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN	POSSIBLE EXDRA ID	FIBER SIZE: (mm) DIAMETER	(mm) LENGTH	ASPECT
)	1	↘	↘					1	27	27
	2	↘	↘					1	10	10
	3			↘				1	13	13
	4	↘	↘					1	17	17
)	5	↘	↘					1	15	15
	6	↘	↘					2	10	5
	7	↘	↘					1	24	24
	8			↘				1.5	8	5.3
	9	↘	↘					1	43	43
	10									
	11									
	12									
	13									
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									
	25									
TOTALS		7	7	2	0	0				
CUMULATIVE TOTALS		73	73	29	1	1				

COMMENTS:

EPA LABORATORY, INC
Contract Lab

6164	AMBIENT AIR	UPWIND FOR SAMPLE 6
Sample Number	Industrial Category	Sample Point Description

5-25-82	4259	4196
Date Analyzed	Blank Number	Standard Number

ANALYSIS INFORMATION:

Detection Limit: 15 Fibers per mm^2

Ashed sample X yes ___ no

Amount of Air Filtered: 6.15 cubic meters

Fields Examined 20

Total Filter Area 960 mm^2

Chrysotile Fibers (all sizes): 17

Chrysotile Concentration:

Calculated Mass 0.9 ng/m^3

Calculated Fibers 2×10^{-2} $fibers/cc^3$

SCC USE ONLY

DATA INTERPRETATION

___ Shows positive indication of chrysotile asbestos in the ambient air.

___ Shows no indication of chrysotile asbestos in the ambient air.

___ Cannot be interpreted because of the limited number of chrysotile fibers counted.

Effluent Guidelines Division

ASBESTOS DATA REPORT

EPA Sample No: A16-14
Industrial Category: ASBESTOS PAINT

SAMPLE DATA

Laboratory: EMS LABORATORIES INC
Lab ID Number: 42301
Date analyzed: 5-22-92
Analyst: B. COOPER
Filter Type: 0.1 μ nucleopore
Preparation technique: modified Jaffe Wick
Method of counting: grid square
Volume of field sample filtered:

OPERATING CONDITIONS

Mode: ___ TEM
Beam current μA: 25
Sample tilt (°): 0°
Actual screen magnification: 20,000
Av. grid area (mm²): [illegible]
No. of grid squares counted: [illegible]
Address for grid storage: [illegible]

GRID NUMBER I, II, III, IV (circle one)

JARE MBER	(✓) FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION: (✓) CHRYSOTILE	(✓) OTHER FIBERS (NON-CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN	POSSIBLE EXTRA ID	FIBER SIZE: (mm) DIAMETER	(mm) LENGTH	ASPECT RA
	1			✓				1	20	20
D	2									
	3	✓	✓					1	15	15
D	4									
	5	✓	✓					1	8	8
	6	✓	✓					2.5	12	4.8
	7	✓	✓					2.5	27	10.8
	8	✓	✓					1.5	20	13.3
	9	✓	✓					1	14	14
	10			✓				1	18	18
	11	✓	✓					1	45	45
	12			✓				2	85	42.5
	13	✓	✓					1.5	22	14.7
	14	✓	✓					1.5	30	20
	15	✓	✓					1	22	22
	16	✓	✓					.2	45	225
	17	✓	✓					1.5	22	14.7
	18	✓	✓					1	27	27
	19	✓	✓					1	40	40
	20	✓	✓					1.5	12	8
	21									
	22									
	23									
	24									
	25									
TOTALS		15	15	3	0	0				

USE ADDITIONAL PAGES IF ... COMMENTS IF NECESSARY

ASBESTOS DATA REPORT
(cont'd)

EPA Sample No: A1614
Industrial Category: AMBIENT AIR
Page 2 of 2

GRID NUMBER: I, (II), III, IV (circle one)

SQUARE NUMBER	FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION: (✓) CHRYSOTILE	(✓) OTHER FIBERS (NON CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN	POSSIBLE EXPLAIN	FIBER SIZE: (mm) DIAMETER	(mm) LENGTH	ASPECT
1	1			✓				.1	1.0	10
	2	✓	✓					.15	1.7	11.3
21	3									
2	4					✓		.1	.20	2.0
2	5									
2	6	✓	✓					.2	.14	7
	7			✓				.1	.7	7
3	8									
3	9					✓		.2	3.3	16.5
3	10									
	11									
	12									
	13									
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									
	25									
TOTALS		2	2	2	0	2				
CUMULATIVE TOTALS		17	17	5	0	2				

COMMENTS: BUNDLES OF FIBERS FOUND IN SQUARES 8, 9, AND 10 OF GRID "I".

LAB SUMMARY SHEET

JUN 1 6 1992

EMS LABORATORIES INC
Contract Lab

A1615	AMBIENT AIR		MIDSITE (COARSE)
Sample Number	Industrial Category		Sample Point Description

5-26-92	4289	4196
Date Analyzed	Blank Number	Standard Number

ANALYSIS INFORMATION:

Detection Limit: 150 Fibers per mm^2

Ashed sample X yes ___ no

Amount of Air Filtered: 0.752 cubic meters

Fields Examined 2

Total Filter Area 960 mm^2

Chrysotile Fibers (all sizes): 144

Chrysotile Concentration:

Calculated Mass 450 $ng/^3$

Calculated Fibers .12 $fibers/cc^3$

SCC USE ONLY

DATA INTERPRETATION

___ Shows positive indication of chrysotile asbestos in the ambient air.

___ Shows no indication of chrysotile asbestos in the ambient air.

___ Cannot be interpreted because of the limited number of chrysotile fibers counted.

JUN 16 1982

Effluent Guidelines Division

ASBESTOS DATA REPORT

EPA Sample No 21615
Industrial Category: AMBIENT AIR
Page 1 of 1

SAMPLE DATA

Laboratory: EMS LABORATORIES INC
Lab ID Number: 428-1
Date analyzed: 5-JUL-82
Analyst: B. TOOPER
Filter Type: 0.1 μ nuclepore
Preparation technique: modified Jaffe Wick
Method of counting: grid square
Volume of field sample filtered: 0.752

OPERATING CONDITIONS

Mode: TEM
Beam current μA: 35
Sample tilt (°): 0°
Actual screen magnification: x 20,000
Av. grid area (mm²): 0.00152 mm²
No. of grid squares counted: 2
Address for grid storage: 90-DET

GRID NUMBER: (I) II, III, IV (circle one)

JARE BER	FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION: (✓) CHRYSOTILE	(✓) OTHER FIBERS (NON-CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN	POSSIBLE EXTRA ID	FIBER SIZE: (mm) DIAMETER	(mm) LENGTH	ASPECT RA
	1	✓	✓					1	10	10
	2			✓				.5	8	5.3
	3	✓	✓					1	22	22
	4	✓	✓					1	30	30
	5	✓	✓					.5	15	10
	6	✓	✓					.5	25	16.7
	7	✓	✓					1	10	10
	8	✓	✓					1	14	14
	9	✓	✓					1	10	10
	10	✓	✓					2	90	45
	11	✓	✓					1.5	65	43.3
	12	✓	✓					1	45	45
	13	✓	✓					1	20	20
	14	✓	✓					1.5	7	4.7
	15	✓	✓					2	10	5
	16	✓	✓					4	12	3
	17	✓	✓					1.5	20	13.3
	18	✓	✓					1	8	8
	19	✓	✓					1	14	14
	20	✓	✓					1.5	100	66.7
	21	✓	✓					2	19	9.5
	22	✓	✓					1.5	14	9.3
	23	✓	✓					1	30	30
	24	✓	✓					1.5	15	10
	25	✓	✓					4	14	3.5
TOTALS		24	24	1	0	0				

USE ADDITIONAL PAGES FOR COMMENTS, IF NECESSARY

Industrial Category: [illegible]
Page 2 of 7

GRID NUMBER: I, II, III, IV (circle one)

RE ER	FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION: (✓) CHRYSOTILE	(✓) OTHER FIBERS (NON-CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN	POSSIBLE EXOTAID	FIBER SIZE: (mm) DIAMETER	(mm) LENGTH	ASPECT RAT
NT	1	✓	✓					2	45	22.5
	2	✓	✓					1.5	10	6.7
	3	✓	✓					1	20	20
	4	✓	✓					1.5	20	13.3
	5	✓	✓					1	20	20
	6	✓	✓					1	10	10
	7	✓	✓					1	14	14
	8	✓	✓					2	42	21
	9	✓	✓					1	8	8
	10	✓	✓					1.5	35	23.3
	11	✓	✓					1	12	12
	12	✓	✓					1	20	20
	13	✓	✓					1	14	14
	14	✓	✓					1	13	13
	15	✓	✓					1	40	40
	16	✓	✓					1	19	19
	17	✓	✓					1	25	25
	18	✓	✓					1	25	25
	19	✓	✓					1	30	30
	20	✓	✓					1	16	16
	21	✓	✓					2	225	112
	22			✓				3	60	20
	23	✓	✓					1	10	10
	24	✓	✓					3	30	15
	25	✓	✓					1	40	40
TALS		24	24	1	0	0				
LATIVE TOTALS		18	42	3	0	0				

MENTS:

ASBESTOS DATA REPORT
(cont'd)

EPA Sample No: A16L5
Industrial Category: BUILDING AIR
Page 3 of 7

GRID NUMBER (I), II, III, IV (circle one)

SQUARE NUMBER	(✓) FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION: (✓) CHRYSOTILE	(✓) OTHER FIBERS (NON-CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN	POSSIBLE EXTRA ID	FIBER SIZE: (mm) DIAMETER	(mm) LENGTH	ASPECT
CONT.	1	✓	✓					1	.28	28
	2	✓	✓					1	.60	60
	3	✓	✓					1	.12	12
	4	✓	✓					1.5	.27	18
	5	✓	✓					1	.35	35
	6	✓	✓					1	.14	14
	7	✓	✓					2	.20	10
	8	✓	✓					2	.30	15
	9	✓	✓					1	.22	22
	10	✓	✓					1	.30	30
	11	✓	✓					1	.10	10
	12	✓	✓					1	.14	14
	13	✓	✓					1.5	.16	10.6
	14	✓	✓					1	.45	45
	15	✓	✓					1	.32	32
	16	✓	✓					1	.17	17
	17	✓	✓					1	.28	28
	18	✓	✓					1.5	.30	20
	19	✓	✓					1	.14	14
	20	✓	✓					1.5	.15	10
	21	✓	✓					1	.16	16
	22	✓	✓					1	.10	10
	23	✓	✓					1	.14	14
	24	✓	✓					1	.25	25
	25	✓	✓					1	.20	20
TOTALS		25	25	0	0	0				
CUMULATIVE TOTALS		73	73	2	0	0				

COMMENTS:

Industrial Category: [illegible]
Page 4 of 4

GRID NUMBER: I, II, III, IV (circle one)

			POSITIVE DIFFRACTION PATTERN IDENTIFICATION					FIBER SIZE		
	(✓) FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	(✓) CHRYSOTILE	(✓) OTHER FIBERS (NON-CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN	POSSIBLE EXDRAID	(mm) DIAMETER	(mm) LENGTH	ASPECT RA
	1	✓	✓					1	20	20
	2	✓	✓					2	72	36
	3	✓	✓					1	20	20
	4	✓	✓					1	14	14
	5	✓	✓					1.5	68	45.3
	6	✓	✓					1	48	48
	7	✓	✓					1	60	60
	8	✓	✓					1	45	45
	9	✓	✓					1	20	20
	10	✓	✓					2.5	26	10.4
	11	✓	✓					2	22	11
	12	✓	✓					1.5	14	9.3
	13	✓	✓					1.5	25	16.7
	14	✓	✓					1	20	20
	15	✓	✓					1	8	8
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									
	25									
TOTALS		15	15	0	0	0				
CUMULATIVE TOTALS		88	88	2	[illegible]	[illegible]				

COMMENTS:

ASBESTOS DATA REPORT
(cont'd)

EPA Sample No: 0615
Industrial Category: AMBIENT AIR
Page 5 of 7

GRID NUMBER: I, II, III, IV (circle one)

SQUARE NUMBER	(✓) FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION: (✓) CHRYSOTILE	(✓) OTHER FIBERS (NON-CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN	POSSIBLE EXOTRA ID	FIBER SIZE: (mm) DIAMETER	(mm) LENGTH	ASPEC
(1)	1	✓	✓					1	16	16
	2	✓	✓					1.5	34	24
	3	✓	✓					1.5	16	10
	4					✓		1	14	14
	5	✓	✓					1.5	21	14
	6	✓	✓					1	13	13
	7	✓	✓					1	8	8
	8	✓	✓					1	34	34
	9	✓	✓					1.5	40	27
	10	✓	✓					2	33	16
	11	✓	✓					1.5	28	18
	12	✓	✓					2	65	33
	13	✓	✓					2	36	18
	14	✓	✓					2	17	8
	15	✓	✓					1.5	22	14
	16					✓		1	14	14
	17	✓	✓					1.5	14	9
	18	✓	✓					1.5	15	10
	19	✓	✓					2	20	10
	20	✓	✓					1	37	37
	21	✓	✓					1	27	27
	22	✓	✓					1	12	12
	23	✓	✓					2	44	22
	24	✓	✓					1.5	10	7
	25	✓	✓					2.5	20	8
TOTALS		23	23	0	0	1				
CUMULATIVE TOTALS		111	111	3	0	3				

COMMENTS:

(cont'd)

EPA Sample No: [illegible]
Industrial Category: AMBIENT AIR
Page 6 of 7

GRID NUMBER: I, (II), III, IV (circle one)

ARE BER	(✓) FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION: (✓) CHRYSOTILE	(✓) OTHER FIBERS (NON-CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN	POSSIBLE EXOTA ID	FIBER SIZE: (mm) DIAMETER	(mm) LENGTH	ASPECT R:
	1	✓	✓					1.5	35	23.3
	2	✓	✓					2	27	13.5
	3	✓	✓					2	22	11
	4					✓		2	23	11.5
	5			✓				2	18	9
	6	✓	✓					3	24	8
	7	✓	✓					2	22	11
	8	✓	✓					1.5	13	8.7
	9	✓	✓					2	11	5.5
	10			✓				3	16	5.3
	11			✓				3	12	4
	12					✓		1	7	7
	13	✓	✓					1	8	8
	14	✓	✓					1.5	22	14.7
	15	✓	✓					1.5	10	6.7
	16	✓	✓					2	30	15
	17	✓	✓					1	17	17
	18	✓	✓					1	10	10
	19	✓	✓					1	9	9
	20	✓	✓					1	17	17
	21	✓	✓					2	45	22.5
	22	✓	✓					1	8	8
	23	✓	✓					1	12	12
	24	✓	✓					3	9	3
	25	✓	✓					2	22	11
TOTALS		20	20	3	0	2				
CUMULATIVE TOTALS		131	131	3	0	7				

COMMENTS:

ASBESTOS DATA REPORT
(cont'd)

EPA Sample No: A1615
Industrial Category: [illegible]
Page 1 of 1

GRID NUMBER: I, II, III, IV (circle one)

SQUARE NUMBER	(✓) FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION (✓) CHRYSOTILE	(✓) OTHER FIBERS (NON-CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN	POSSIBLE EXTRA ID	FIBER SIZE (mm) DIAMETER	(mm) LENGTH	ASPE
DCONT	1	✓	✓					1	11	11
	2	✓	✓					1	30	3
	3	✓	✓					1	30	3
	4					✓		1	15	1
	5	✓	✓					3	100	3
	6	✓	✓					1	9	
	7					✓		2	9	1
	8	✓	✓					1	19	
	9	✓	✓					1	28	
	10	✓	✓					3	18	
	11	✓	✓					1	15	
	12	✓	✓					1	9	
	13	✓	✓					1	13	
	14	✓	✓					2	14	
	15	✓	✓					1	29	
	16			✓				2	15	
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									
	25									
TOTALS		13	13	1	0	2				
CUMULATIVE TOTALS		144	144	1	0	2				

COMMENTS:

JUN 16 1982

EMS LABORATORIES INC.
Contract Lab

A1616	AMBIENT AIR	MIDDLE (FINE)
Sample Number	Industrial Category	Sample Point Description
5-27-82	4289	4196
Date Analyzed	Blank Number	Standard Number

ANALYSIS INFORMATION:

Detection Limit: 21 Fibers per mm^2

Ashed sample X yes ___ no

Amount of Air Filtered: 6.75 cubic meters

Fields Examined 14

Total Filter Area 960 mm^2

Chrysotile Fibers (all sizes): 119

Chrysotile Concentration:

Calculated Mass 270 ng/m^3

Calculated Fibers 0.2 $fibers/cc^3$

SCC USE ONLY

DATA INTERPRETATION

___ Shows positive indication of chrysotile asbestos in the ambient air.

___ Shows no indication of chrysotile asbestos in the ambient air.

___ Cannot be interpreted because of the limited number of chrysotile fibers counted.

JUN 16 1982

Effluent Guidelines Division

ASBESTOS DATA REPORT

EPA Sample No: A1616
Industrial Category: AMBIENT AIR
Page 1 of 2

SAMPLE DATA

Laboratory: EMS LABORATORIES INC.
Lab ID Number: 4281
Date analyzed: 5-20-1982
Analyst: B. TOMER
Filter Type: 0.1 μ nuclepore
Preparation technique: modified Jaffe Wick
Method of counting: grid square
Volume of field sample filtered: 1.75 m³

OPERATING CONDITIONS

Mode: TEM
Beam current μA: 35
Sample tilt (°): 0°
Actual screen magnification: 20,000
Av. grid area (mm²): 0.00313
No. of grid squares counted: 17
Address for grid storage: CAIT

GRID NUMBER I, II, III, IV (circle one)

SQUARE NUMBER	FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION: (✓) CHRYSOTILE	(✓) OTHER FIBERS (NON-CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN	POSSIBLE EXDRA ID	FIBER SIZE: (mm) DIAMETER	(mm) LENGTH	ASPECT
D	1	✓	✓					.1	10	10
	2	✓	✓					.1	12	12
	3	✓	✓					.3	10	1
	4	✓	✓					.2	12	6
	5	✓	✓					.15	11	7
	6	✓	✓					.15	20	13
	7	✓	✓					.10	225	5
	8	✓	✓					.15	15	1
	9					✓		.15	19	1
	10	✓	✓					.35	12	1
	11	✓	✓					.15	150	10
	12	✓	✓					.1	55	5
	13	✓	✓					.15	11.5	1
D	14	✓	✓					.15	25	1
	15	✓	✓					.1	32	3
	16	✓	✓					.15	10	1
	17	✓	✓					.2	8	4
	18	✓	✓					.2	9	4
	19	✓	✓					.2	18	9
	20	✓	✓					.1	32	32
	21	✓	✓					.1	14	14
	22	✓	✓					.2	18	9
	23			✓				.2	12	6
D	24	✓	✓					.2	8	4
	25				✓			.2	12	6
TOTALS		22	22	1	1	1				

USE ADDITIONAL PAGES FOR COMMENTS, IF NECESSARY

ASBESTOS DATA REPORT
(cont'd)

EPA Sample No: A1616
Industrial Category: AMBIENT AIR
Page 2 of 6

GRID NUMBER: I, II, III, IV (circle one)

SQUARE NUMBER	(✓) FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION				POSSIBLE EXOTAXID	FIBER SIZE		ASPECT
			(✓) CHRYSOTILE	(✓) OTHER FIBERS (NON CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN		(mm) DIAMETER	(mm) LENGTH	
(2001)	1	✓	✓					.3	1.3	4.3
	2					✓		1.0	3	3
	3	✓	✓					1	14	14
	4	✓	✓					1	27	27
	5	✓	✓					1	8	8
	6	✓	✓					1.5	30	20
	7	✓	✓					1	17	17
	8	✓	✓					1	22	22
	9			✓				2.5	10	4
	10	✓	✓					1	15	15
	11			✓				2	10	5
	12	✓	✓					1	20	20
	13	✓	✓					1	17	17
(4)	14	✓	✓					1.5	23	15
	15	✓	✓					1	26	26
	16	✓	✓					1	14	14
	17					✓		1	16	16
	18	✓	✓					1.5	14	9
	19	✓	✓					1	22	22
	20					✓		1	26	26
	21	✓	✓					1.5	22	15
	22	✓	✓					1.5	8	5
	23	✓	✓					1.5	12	8
	24			✓				4	160	40
(5)	25	✓	✓					3	33	11
TOTALS		19	19	3	0	3				
CUMULATIVE TOTALS		41	41	7	1	4				

COMMENTS:

(cont'd)

EPA Sample No: A1646
Industrial Category: AMBIENT AIR
Page 3 of 6

GRID NUMBER: I, II, III, IV (circle one)

SQUARE NUMBER	(✓) FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION				POSSIBLE EXDRA ID	FIBER SIZE		ASPECT
			(✓) CHRYSOTILE	(✓) OTHER FIBERS (NON-CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN		(mm) DIAMETER	(mm) LENGTH	
cont	1			✓				.2	.80	40
	2			✓				.1	.18	1.8
	3			✓				.1	.30	3
	4	✓	✓					.5	6.5	13
	5	✓	✓					1.5	33	
	6	✓	✓					.3	14	47
	7	✓	✓					.1	.16	1.6
	8				✓			.2	2.2	11
	9				✓			.1	.14	1.4
	10	✓	✓					.1	.27	3
	11	✓	✓					2.5	54	16
	12	✓	✓					.1	.10	1
	13	✓	✓					.1	.14	1.4
	14	✓	✓					1.5	38	25
	15	✓	✓					1.5	170	113
	16	✓	✓					.1	33	330
	17	✓	✓					.1	.95	9.5
	18	✓	✓					.1	.10	1.0
	19	✓	✓					.1	.45	4.5
	20	✓	✓					.2	.18	1.8
	21	✓	✓					.2	.25	1.25
	22	✓	✓					.2	.45	2.25
	23	✓	✓					1.5	30	20
	24									
	25									
TOTALS		18	18	3	2	0				
CUMULATIVE TOTALS		59	59	7	5	4				

COMMENTS:

HUGE BUNDLE FOUND IN GRID SQUARE #5 OF GRID #1.

GRID NUMBER: I, II, III, IV (circle one)

SQUARE NUMBER	FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION: (✓) CHRYSOTILE	(✓) OTHER FIBERS (NON-CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN	POSSIBLE EXPLAID	FIBER SIZE: (mm) DIAMETER	(mm) LENGTH	ASPECT
1	1			✓				.3	.24	8
	2			✓				.2	.14	7
	3			✓				.3	.16	5.3
	4				✓			.1	.19	1.9
	5	✓	✓					.15	.33	2.2
	6	✓	✓					.12	.24	1.9
	7	✓	✓					.2	.15	7.5
	8	✓	✓					.25	.22	8.8
	9	✓	✓					.2	.34	1.7
	10	✓	✓					.15	.23	1.5
	11	✓	✓					.1	.142	1.4
	12	✓	✓					.1	.12	1.2
	13	✓	✓					.1	.17	1.7
2	14				✓			.15	.19	1.26
	15	✓	✓					.15	.12	.8
	16	✓	✓					.1	.10	1
	17	✓	✓					.2	.18	9
	18	✓	✓					.1	.8	.8
3	19	✓	✓					.1	.35	3.5
	20	✓	✓					.2	.102	5.1
	21	✓	✓					.15	.386	2.57
	22	✓	✓					.15	.26	1.7
	23	✓	✓					.1	.36	3.6
	24	✓	✓					.2	.10	5
	25	✓	✓					.15	.42	2.8
TOTALS		20	20	3	2	0				
CUMULATIVE TOTALS		79	79	10	5	1				

COMMENTS:

ASBESTOS DATA REPORT
(cont'd)

EPA Sample No: 21616
Industrial Category AMBIENT AIR
Page 2 of 6

GRID NUMBER: I, (II), III, IV (circle one)

SQUARE NUMBER	(✓) FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION: (✓) CHRYSOTILE	(✓) OTHER FIBERS (NON-CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN	POSSIBLE EXTRA ID	FIBER SIZE: (mm) DIAMETER	(mm) LENGTH	ASPECT
(CONT	1	✓	✓					.1	.17	1.7
)	2					✓		.15	.7	4.6
	3	✓	✓					.15	.10	6.6
	4	✓	✓					.1	.11	1.1
	5	✓	✓					.05	.12	9.6
	6	✓	✓					.15	.90	6.0
(5)	7	✓	✓					.3	.24	1.6
	8					✓		.1	.9	9.0
	9	✓	✓					.15	.36	2.4
	10	✓	✓					.3	.30	10.0
	11	✓	✓					.1	.58	5.8
(10)	12	✓	✓					.1	.23	2.3
	13	✓	✓					.2	.20	1.0
	14	✓	✓					.15	.11	7.3
	15	✓	✓					.1	.28	2.8
	16	✓	✓					.3	.23	11.5
(7)	17	✓	✓					.2	.36	1.8
	18	✓	✓					.3	.32	1.1
	19	✓	✓					.15	.20	1.3
	20	✓	✓					.2	.32	1.6
	21			✓				.15	.19	1.3
	22					✓		.1	.10	1.0
	23	✓	✓					.15	.35	2.3
	24	✓	✓					.1	.22	2.2
	25	✓	✓					.2	.21	1.0
TOTALS		21	21	1		3				
CUMULATIVE TOTALS		100	100	11		5				

COMMENTS:

ASBESTOS DATA REPORT
(cont'd)

EPA Sample No: B1616
Industrial Category: ROOM VI AIR
Page 6 of 6

GRID NUMBER: I, (II), III, IV (circle one)

SQUARE NUMBER	(✓) FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION: (✓) CHRYSOTILE	(✓) OTHER FIBERS (NON-CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN	POSSIBLE EXTRA ID	FIBER SIZE: (mm) DIAMETER	(mm) LENGTH	ASPECT
SQ1	1	✓	✓					1	2.6	2
	2	✓	✓					3	54	18
	3	✓	✓					1.5	105	3
	4	✓	✓					2	40	2
	5	✓	✓					2	24	1
	6	✓	✓					2	15	7
	7	✓	✓					1.5	24	16
	8			✓				2	10	5
	9	✓	✓					2.5	12	4
	10	✓	✓					2	32	16
	11	✓	✓					1.5	50	33
	12			✓				1.5	9	6
	13	✓	✓					3.5	30	15
	14	✓	✓					2	16	8
	15	✓	✓					1	15	15
	16	✓	✓					2	30	15
	17	✓	✓					1.5	82	55
	18	✓	✓					1	15	15
	19	✓	✓					1	13	13
	20			✓				3	24	8
	21	✓	✓					1.5	24	16
	22	✓	✓					1	20	20
	23					✓		1	10	10
	24			✓				2	94	47
	25									
TOTALS		19	19	4	0	1				
CUMULATIVE TOTALS		119	119	15	3	1				

COMMENTS:

EMS LABORATORIES INC
Contract Lab

8116	AMBIENT AIR	DOWNWIND / CORNER
Sample Number	Industrial Category	Sample Point Description
5-27-82	4289	4196
Date Analyzed	Blank Number	Standard Number

ANALYSIS INFORMATION:

Detection Limit: 150 Fibers per mm^2

Ashed sample X yes ___ no

Amount of Air Filtered: .752 cubic meters

Fields Examined 2

Total Filter Area 960 mm^2

Chrysotile Fibers (all sizes): 250

Chrysotile Concentration:

Calculated Mass 1.9×10^3 ng/m^3

Calculated Fibers 21 $fibers/cc^3$

SCC USE ONLY

DATA INTERPRETATION

___ Shows positive indication of chrysotile asbestos in the ambient air.

___ Shows no indication of chrysotile asbestos in the ambient air.

___ Cannot be interpreted because of the limited number of chrysotile fibers counted.

JUN 16 1982

Effluent Guidelines Division

ASBESTOS DATA REPORT

EPA Sample No: N667-
Industrial Category: AMBIENT AIR
Page 1 of 12

SAMPLE DATA

Laboratory: EMSLABORATORIES INC
Lab ID Number: 4230
Date analyzed: 5-27-82
Analyst: BISOPLES
Filter Type: 0.1 μ nucleopore
Preparation technique: modified Jaffe Wick
Method of counting: grid square
Volume of field sample filtered: 0.752

OPERATING CONDITIONS

Mode: TEM
Beam current μA: 3.25
Sample tilt (°): 0°
Actual screen magnification: x 20,000
Av. grid area (mm²): 0.00127
No. of grid squares counted: 12
Address for grid storage: 90-02 JEL

GRID NUMBER: (I), II, III, IV (circle one)

UARE MBER	(✓) FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION: (✓) CHRYSOTILE	(✓) OTHER FIBERS (NON-CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN	POSSIBLE EXORA ID	FIBER SIZE: (mm) DIAMETER	(mm) LENGTH	ASPECT R
)	1	✓	✓					1	16	16
	2	✓	✓					1.5	17	11.3
	3	✓	✓					1	13	13
	4	✓	✓					1	20	20
	5	✓	✓					1	33	33
	6			✓				5	45	9
	7	✓	✓					1	22	22
	8	✓	✓					3	25	8.3
	9	✓	✓					3	27	9
	10	✓	✓					1	25	6.3
	11	✓	✓					1	46	46
	12	✓	✓					1	.20	20
	13	✓	✓					3	25	8.3
	14	✓	✓					2	40	20
	15			✓				2	12	6
	16	✓	✓					3	580	193
	17			✓				2	25	12
	18	✓	✓					3	30	10
	19	✓	✓					1.5	10	6
	20	✓	✓					1	25	25
	21			✓				2	18	9
	22	✓	✓					1	30	30
	23	✓	✓					1	14	14
	24	✓	✓					2.5	180	72
	25	✓	✓					1	15	15
TOTALS		21	21	4	0	0				

USE ADDITIONAL PAGE FOR COMMENTS, IF NECESSARY

ASBESTOS DATA REDUCTION
(cont'd)

EPA Sample No: A1617-
Industrial Category: AMBIENT AIR
Page 2 of 12

GRID NUMBER: (I) II, III, IV (circle one)

SQUARE NUMBER	(✓) FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION				POSSIBLE EXOTIC ID	FIBER SIZE		ASPECT
			(✓) CHRYSOTILE	(✓) OTHER FIBERS (NON-CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN		(mm) DIAMETER	(mm) LENGTH	
CONT	1	✓	✓					.2	14	
	2	✓	✓					1	12	1:
	3	✓	✓					1	48	4:
	4	✓	✓					.3	25	
	5	✓	✓					.5	18	1:
	6	✓	✓					1	40	4:
	7	✓	✓					1	18	1:
	8	✓	✓					1	17	1
	9	✓	✓					1	20	2
	10	✓	✓					1	14	1:
	11	✓	✓					1	22	2
	12	✓	✓					1	12	1:
	13	✓	✓					1	14	1:
	14	✓	✓					1	8	
	15	✓	✓					1	10	1:
	16	✓	✓					1	14	1:
	17	✓	✓					1	17	1
	18	✓	✓					1	20	2
	19	✓	✓					.25	12	
	20			✓				.2	16	
	21	✓	✓					1	18	
	22	✓	✓					.5	20	
	23	✓	✓					1	13	
	24	✓	✓					.4	6.0	
	25	✓	✓					1	8	
TOTALS		24	24	1	0	0				
CUMULATIVE TOTALS		45	45	5	0	0				

COMMENTS:

TWO ENORMOUS BUNDLES WERE FOUND IN GRID #I

A FEW LARGE BUNDLES WERE FOUND IN GRID #II

(cont'd)

EPA Sample No: [illegible]
Industrial Category: AMBIENT AIR
Page 3 of 12

GRID NUMBER (I), II, III, IV (circle one)

SQUARE NUMBER	(✓) FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION				POSSIBLE EXTRA ID	FIBER SIZE		ASPECT
			(✓) CHRYSOTILE	(✓) OTHER FIBERS (NON CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN		(mm) DIAMETER	(mm) LENGTH	
OUT	1	✓	✓					1	10	10
	2	✓	✓					1	16	16
	3	✓	✓					1	13	13
	4	✓	✓					1	45	45
	5	✓	✓					2.5	110	44
	6	✓	✓					1	45	45
	7	✓	✓					1	49	49
	8	✓	✓					2	28	14
	9	✓	✓					2	18	9
	10	✓	✓					1	15	15
	11	✓	✓					1	12	12
	12	✓	✓					1	14	14
	13	✓	✓					1	16	16
	14	✓	✓					1	45	45
	15	✓	✓					1.5	30	20
	16	✓	✓					3.5	38	11
	17	✓	✓					1	10	10
	18	✓	✓					1.5	16	10
	19	✓	✓					1	9	9
	20	✓	✓					2	12	6
	21	✓	✓					1	8	8
	22	✓	✓					1	35	35
	23	✓	✓					1.5	8	5
	24	✓	✓					1	16	16
	25	✓	✓					2	12	6
TOTALS		25	25	0	0	0				
CUMULATIVE TOTALS		70	70	5	0	0				

COMMENTS:

ASBESTOS DATA REPORT
(cont'd)

EPA Sample No: A1617
Industrial Category: AMBIENT AIR
Page 1 of 1

GRID NUMBER (1) II, III, IV (circle one)

ARE BER	FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION: (✓) CHRYSOTILE	(✓) OTHER FIBERS (NON-CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN	POSSIBLE EXPLAID	FIBER SIZE: (mm) DIAMETER	(mm) LENGTH	ASPECT
0.0.	1	✓	✓					1	18	18
	2	✓	✓					<1	22	11
	3	✓	✓					1	18	18
	4	✓	✓					1	20	20
	5	✓	✓					1	12	12
	6	✓	✓					1	16	16
	7	✓	✓					1	18	18
	8	✓	✓					1	18	18
	9	✓	✓					1.5	8	5
	10	✓	✓					2	42	21
	11	✓	✓					2.5	27	10
	12	✓	✓					1	25	25
	13	✓	✓					1	23	23
	14	✓	✓					1	48	48
	15	✓	✓					1	18	18
	16	✓	✓					1	40	40
	17	✓	✓					1	15	15
	18	✓	✓					2.5	22	9
	19	✓	✓					1	55	55
	20	✓	✓					1.5	10	6
	21	✓	✓					1	42	42
	22	✓	✓					1	16	16
	23	✓	✓					1.5	180	120
	24	✓	✓					1.5	14	9
	25	✓	✓					1	53	53
TOTALS		25	25	0	0	0				
CUMULATIVE TOTALS		95	95	5	0	0				

COMMENTS:

GRID NUMBER: (I), II, III, IV (circle one)

ARE BER	(✓) FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION				POSSIBLE EXDRA ID	FIBER SIZE		ASPECT
			(✓) CHRYSOTILE	(✓) OTHER FIBERS (NON-CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN		(mm) DIAMETER	(mm) LENGTH	
CONT	1	✓	✓					1.5	10	6.7
	2	✓	✓					1	10	12
	3	✓	✓					1	2.2	22
	4	✓	✓					1	20	20
	5	✓	✓					1	45	45
	6	✓	✓					1	14	14
	7	✓	✓					1	25	25
	8	✓	✓					2	25	12
	9	✓	✓					2.5	250	125
	10	✓	✓					2.5	36	13
	11	✓	✓					1.5	20	13
	12	✓	✓					2	8	4
	13	✓	✓					1	10	10
	14	✓	✓					1.5	12	8
	15	✓	✓					2	18	9
	16	✓	✓					1	16	16
	17	✓	✓					2	15	7
	18	✓	✓					1	8	8
	19	✓	✓					1	10	10
	20	✓	✓					1.5	10	6
	21	✓	✓					2	10	5
	22	✓	✓					1	2.2	22
	23	✓	✓					1	16	16
	24	✓	✓					2	9	4
	25	✓	✓					1.5	14	9
TOTALS		25	25	0	0	0				16
CUMULATIVE TOTALS		120	120	5						

COMMENTS:

(cont'd)

EPA Sample No: 41641 T
Industrial Category: AMBIENT AIR
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GRID NUMBER: I, II, III, IV (circle one)

RE ER	(✓) FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION				POSSIBLE EXOTRA ID	FIBER SIZE		ASPECT RA
			(✓) CHRYSOTILE	(✓) OTHER FIBERS (NON-CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN		(mm) DIAMETER	(mm) LENGTH	
11	1	✓	✓					.2	12	6
	2	✓	✓					1	19	19
	3	✓	✓					1	13	13
	4	✓	✓					1	50	50
	5	✓	✓					1	2.5	2.5
	6	✓	✓					1	65	65
	7	✓	✓					1	18	18
	8	✓	✓					1	14	14
	9	✓	✓					1	16	16
	10	✓	✓					1.5	65	43.3
	11									
	12									
	13									
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									
	25									
ALS		10	10	3	3	0				
ATIVE TOTALS		130	130	5	3	0				

AMENTS:

(cont'd)

EPA Sample No: [illegible]
Industrial Category: AMBIENT AIR
Page 2 of 12

GRID NUMBER: I (II) III, IV (circle one)

SQUARE NUMBER	(✓) FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION				POSSIBLE EXDRA ID	FIBER SIZE		ASPECT
			(✓) CHRYSOTILE	(✓) OTHER FIBERS (NON-CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN		(mm) DIAMETER	(mm) LENGTH	
	1	✓	✓					1	22	22
	2	✓	✓					3	12	4
	3	✓	✓					1	5	5
	4	✓	✓					2	8	4
	5	✓	✓					1	8	8
	6	✓	✓					1.5	42	28
	7			✓				1	16	16
	8	✓	✓					2	28	14
	9	✓	✓					1.5	30	20
	10	✓	✓					2	8	4
	11	✓	✓					1.5	10	6.7
	12	✓	✓					1	14	14
	13	✓	✓					1	16	16
	14	✓	✓					2	65	32.5
	15	✓	✓					2	15	7.5
	16	✓	✓					1.5	12	8
	17			✓				10	45	4.5
	18	✓	✓					1.5	8	5.3
	19	✓	✓					1	14	14
	20	✓	✓					1	10	10
	21	✓	✓					1	25	25
	22	✓	✓					1	20	20
	23	✓	✓					1.5	18	12
	24	✓	✓					1	16	16
	25	✓	✓					1	32	32
TOTALS		23	23	2	0	0				
CUMULATIVE TOTALS		153	153	7	0	0				

COMMENTS:

(cont'd)

EPA Sample No: A1071
Industrial Category: AMBIENT AIR
Page 8 of 12

GRID NUMBER: I, II, III, IV (circle one)

ARE IBER	(✓) FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION				POSSIBLE EXDRA ID	FIBER SIZE		ASPECT
			(✓) CHRYSOTILE	(✓) OTHER FIBERS (NON-CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN		(mm) DIAMETER	(mm) LENGTH	
CONT.	1	✓	✓					1	8	8
	2	✓	✓					1	22	22
	3	✓	✓					1.5	14	9
	4	✓	✓					1.5	18	12
	5	✓	✓					1	10	10
	6			✓				1	8	8
	7	✓	✓					1	8	8
	8			✓				1	10	10
	9	✓	✓					1	14	14
	10	✓	✓					1	45	45
	11	✓	✓					6	38	6
	12	✓	✓					1.5	50	33
	13	✓	✓					1	20	20
	14			✓				2	45	22
	15	✓	✓					1.5	14	9
	16	✓	✓					3	60	20
	17	✓	✓					1	22	22
	18	✓	✓					2	18	9
	19	✓	✓					1	30	30
	20	✓	✓					1	12	12
	21	✓	✓					2	14	7
	22	✓	✓					2	20	10
	23	✓	✓					1	18	18
	24	✓	✓					1	25	25
	25	✓	✓					1	14	14
TOTALS		22	22	3	0	0				
MULATIVE TOTALS		175	175	10	0	0				

COMMENTS:

(cont'd)

EPA Sample No: [illegible]
Industrial Category: AMBIENT AIR
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GRID NUMBER: I (II) III, IV (circle one)

ARE IBER	(✓) FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION				POSSIBLE EXDRA ID	FIBER SIZE		ASPECT
			(✓) CHRYSOTILE	(✓) OTHER FIBERS (NON-CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN		(mm) DIAMETER	(mm) LENGTH	
ont.	1	✓	✓					1	25	25
	2	✓	✓					1	22	22
	3	✓	✓					1.5	18	12
	4	✓	✓					1	22	22
	5	✓	✓					1	10	10
	6	✓	✓					2.5	52	20
	7	✓	✓					1	18	18
	8	✓	✓					1	14	14
	9	✓	✓					1.5	16	10
	10	✓	✓					2	18	9
	11	✓	✓					1.5	12	8
	12	✓	✓					1	25	25
	13	✓	✓					1	20	20
	14	✓	✓					1.5	22	14
	15	✓	✓					1.5	22	14
	16	✓	✓					1	30	30
	17	✓	✓					1	8	8
	18	✓	✓					1	20	20
	19	✓	✓					1	22	22
	20	✓	✓					1	20	20
	21	✓	✓					1	8	8
	22	✓	✓					1	25	25
	23	✓	✓					1	10	10
	24	✓	✓					1	14	14
	25	✓	✓					1	16	16
TOTALS		25	25	0	0	0				
MULATIVE TOTALS		200	200	10	8	5				

OMMENTS:

Industrial Category: AMBIENT AIR
Page 10 of 12

GRID NUMBER: I (II) III, IV (circle one)

...RE ...ER	(✓) FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION: (✓) CHRYSOTILE	(✓) OTHER FIBERS (NON CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN	POSSIBLE EXTRA ID	FIBER SIZE: (mm) DIAMETER	(mm) LENGTH	ASPECT
...nT.	1	✓	✓					1.5	200	133.
	2	✓	✓					1	8	8
	3	✓	✓					2	55	27.
	4	✓	✓					1	10	10
	5			✓				1	16	16
	6	✓	✓					1	6	6
	7			✓				1	18	18
	8	✓	✓					1	17	17
	9	✓	✓					1.5	22	14
	10	✓	✓					1.5	52	34
	11	✓	✓					1.5	50	33
	12	✓	✓					2	60	30
	13	✓	✓					1	14	14
	14	✓	✓					1	22	22
	15					✓		1	15	15
	16	✓	✓					1	20	20
	17	✓	✓					1	12	12
	18	✓	✓					1	12	12
	19	✓	✓					1.5	8	5
	20	✓	✓					1.5	14	9
	21	✓	✓					2	20	10
	22	✓	✓					1	18	18
	23	✓	✓					1	17	17
	24	✓	✓					1	16	16
	25	✓	✓					1	12	12
...TALS		22	22	2	0	1				
...ULATIVE TOTALS		222	222	12	0	1				

...MENTS:

(cont'd)

EPA Sample No: 11151 1
Industrial Category: AMBIENT AIR
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GRID NUMBER: I (II) III, IV (circle one)

ARE BER	(✓) FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION				POSSIBLE EXDRA ID	FIBER SIZE		ASPECT
			(✓) CHRYSOTILE	(✓) OTHER FIBERS (NON-CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN		(mm) DIAMETER	(mm) LENGTH	
cont.	1	✓	✓					1	12	12
	2	✓	✓					1	8	8
	3	✓	✓					1	6	6
	4	✓	✓					1.5	18	12
	5	✓	✓					1	25	25
	6	✓	✓					1.5	14	9
	7	✓	✓					1.5	25	16
	8	✓	✓					1.5	28	18
	9	✓	✓					1	35	35
	10	✓	✓					1.5	18	12
	11	✓	✓					1	20	20
	12	✓	✓					2	18	9
	13	✓	✓					2	20	10
	14	✓	✓					1	18	18
	15	✓	✓					1	22	22
	16	✓	✓					1	18	18
	17	✓	✓					1.5	38	25
	18	✓	✓					2	18	9
	19	✓	✓					14	85	6
	20	✓	✓					1.5	28	18
	21	✓	✓					1	22	22
	22	✓	✓					1	18	18
	23	✓	✓					2	18	9
	24	✓	✓					1.5	15	10
	25	✓	✓					1	20	20
TOTALS		25	25	0	0	0				
CUMULATIVE TOTALS		247	247	12	0	1				

COMMENTS:

ASBESTOS DATA REPORT
(cont'd)

EPA Sample No: A 1617
Industrial Category: AMBIENT AIR
Page 12 of 12

GRID NUMBER: I, (II) III, IV (circle one)

...RE ...ER	FIBER NUMBER	(✓) CHRYSOTILE MORPHOLOGY?	POSITIVE DIFFRACTION PATTERN IDENTIFICATION: (✓) CHRYSOTILE	(✓) OTHER FIBERS (NON-CHRYSOTILE)	(✓) AMBIGUOUS PATTERN	(✓) NO SAED PATTERN	POSSIBLE EXTRA ID	FIBER SIZE: (mm) DIAMETER	(mm) LENGTH	ASPECT
...NT.	1	✓	✓					1	14	14
	2	✓	✓					1	16	16
	3	✓	✓					1	30	30
	4									
	5									
	6									
	7									
	8									
	9									
	10									
	11									
	12									
	13									
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									
	25									
...OTALS		3	3	0	0	0				
...ULATIVE TOTALS		250	250	12	6	1				

...MMENTS:

DATA SUMMARY SHEET

JUN 16 1982

EMS LABORATORIES INC
Contract Lab

A1618	AMBIENT AIR	DOWNWIND FINE
Sample Number	Industrial Category	Sample Point Description

5-23-82	4289	4196
Date Analyzed	Blank Number	Standard Number

ANALYSIS INFORMATION:

Detection Limit: 6.8 Fibers per mm^2

Ashed sample X yes ___ no

Amount of Air Filtered: 6.8 cubic meters

Fields Examined 20

Total Filter Area 960 mm^2

Chrysotile Fibers (all sizes): 0 OBSERVED

Chrysotile Concentration:

Calculated Mass BELOW DETN LIMIT ng/m^3

Calculated Fibers BELOW DETN LIMIT fibers/cc^3

SCC USE ONLY

DATA INTERPRETATION

____ Shows positive indication of chrysotile asbestos in the ambient air.

____ Shows no indication of chrysotile asbestos in the ambient air.

____ Cannot be interpreted because of the limited number of chrysotile fibers counted.